The Mining Journal

Established 1835

Railway & Commercial Gazette

Vol. CCXLV No. 6270 LONDON, OCTOBER 21. 1955 PRICE 8d.

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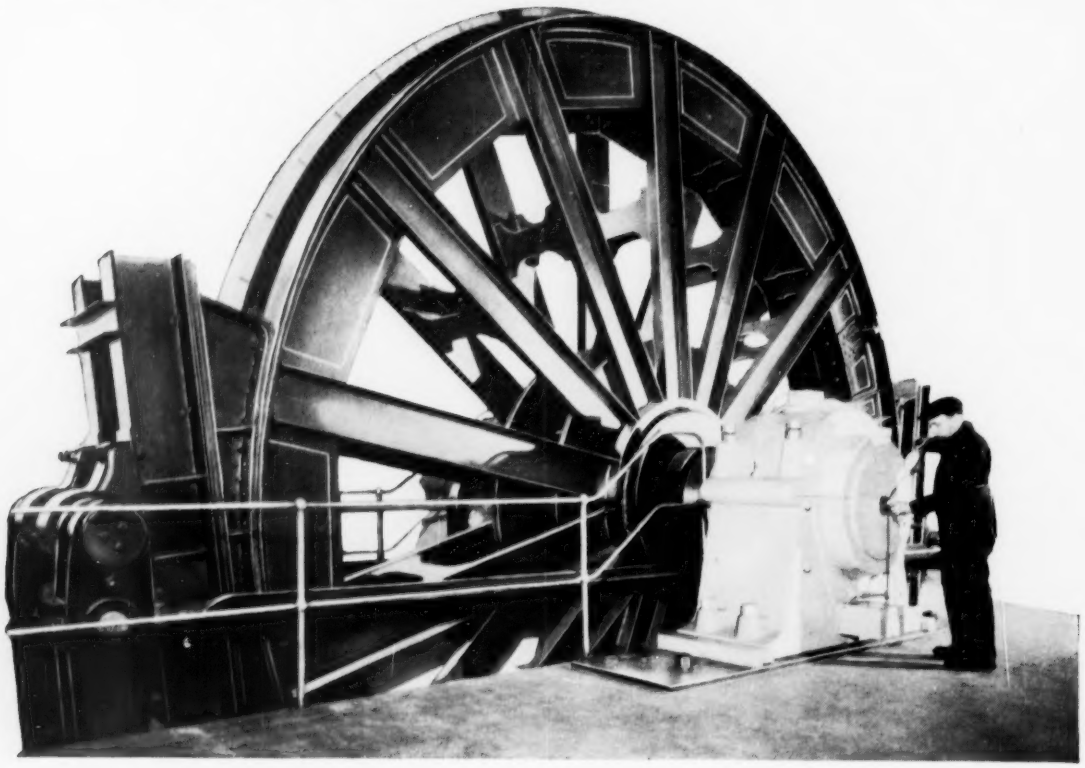

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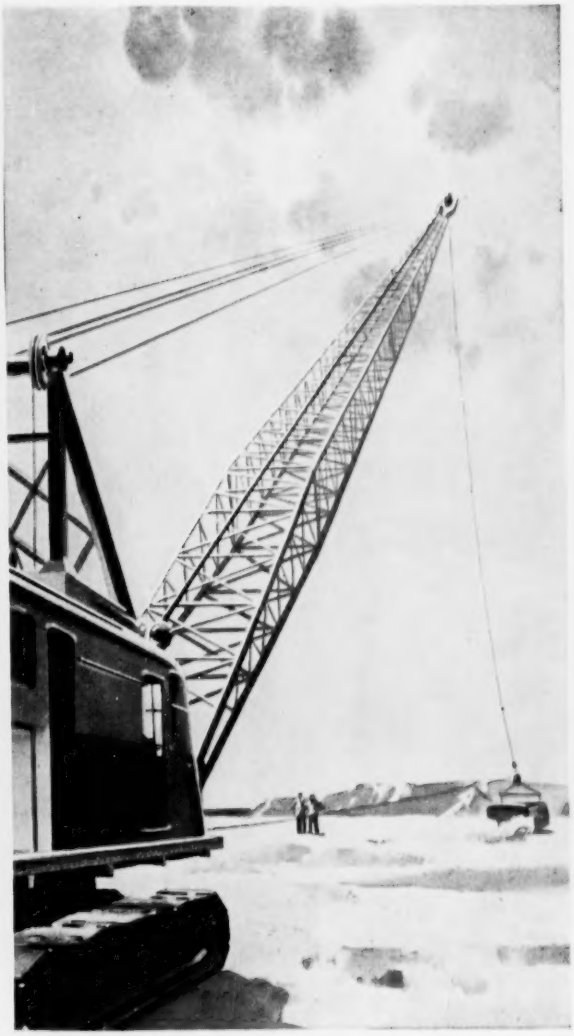
ALUMINIUM AT WORK



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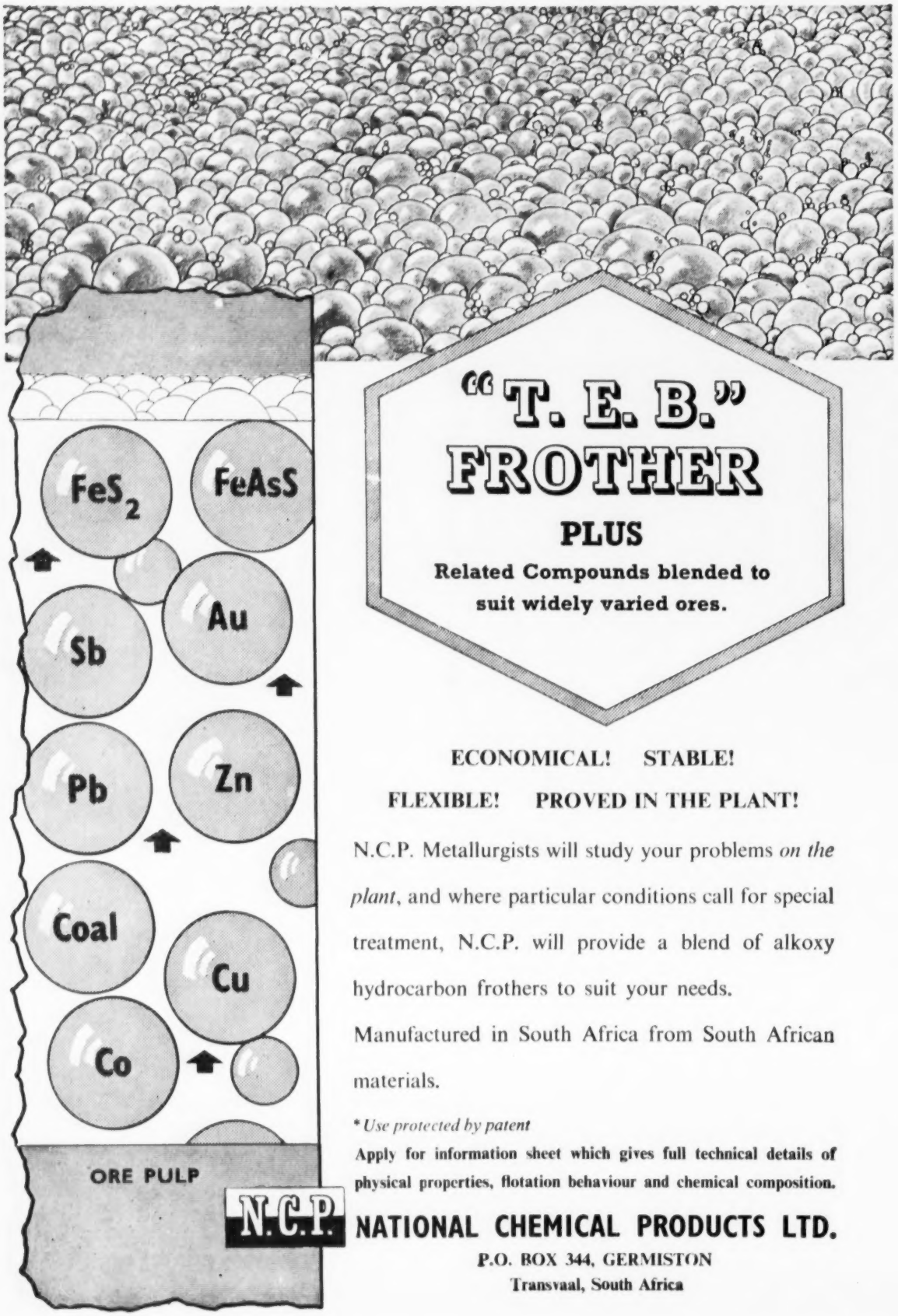

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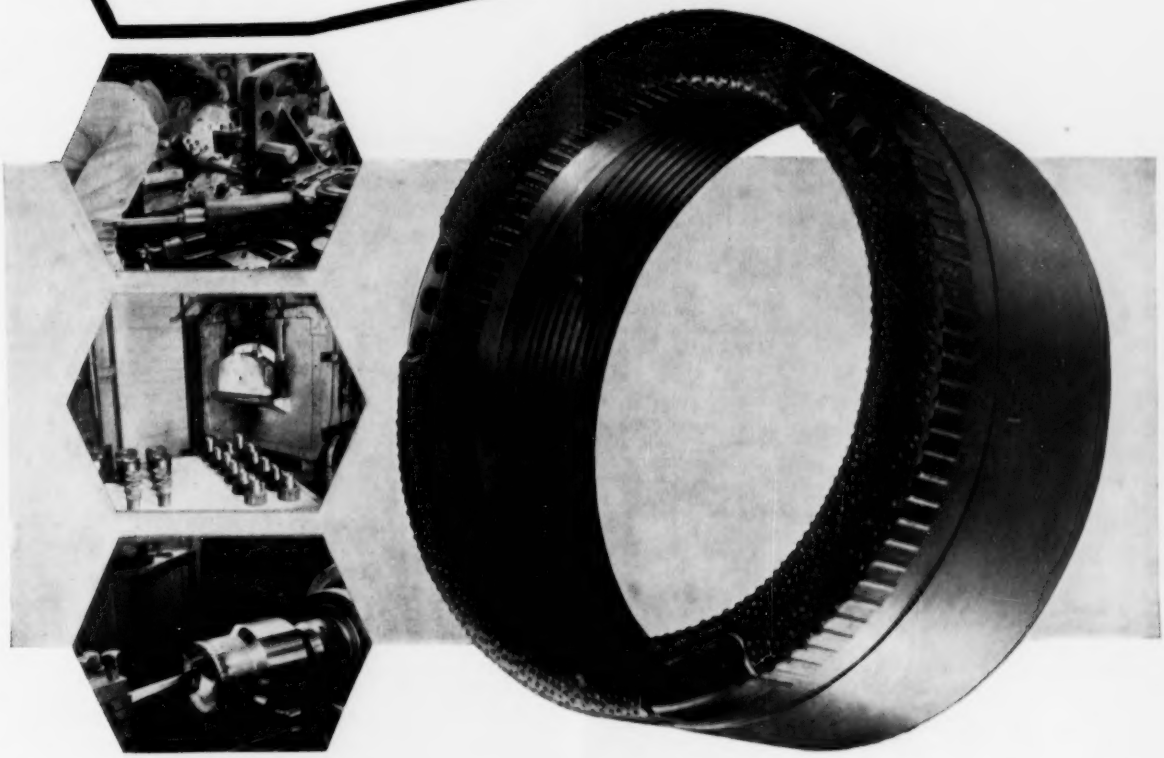

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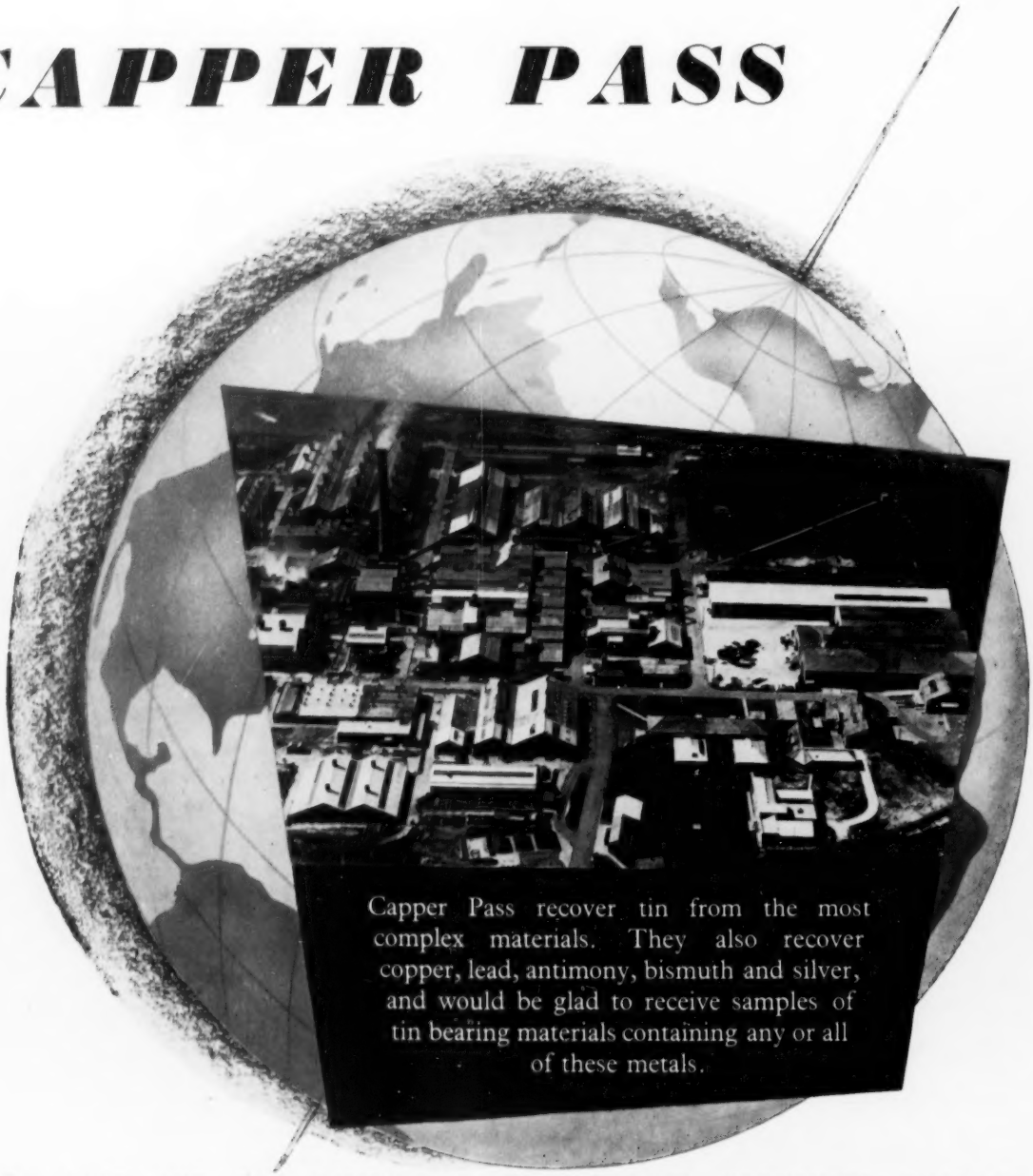

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The Mining Journal
Established 1835

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NOTES AND COMMENTS

The Long View in Rhodesia

If the Union of South Africa has contrived her economic development without the emergence of disastrous stresses and strains, it has yet to be seen whether the same will be true of her social evolution, for she has still to work out the answer to those social problems which have been created by the rapid industrialization of a backward race living side by side with Europeans and Asians of widely differing antecedents and outlook. While it is no part of this Journal's task to consider these problems *per se*, we cannot help seeing that in the Union there must be a limit to industrial expansion without a corresponding increase in the purchasing power of the whole community, irrespective of the social or political status of its component classes.

Sooner or later the need for expanding consumer markets will force upon the South African electorate the economic incompatibility of these with Apartheid. It has yet to be seen, however, whether this happens quickly enough to permit of the working out of some positive alternative racial policy to that being pursued by the Nationalist party. It is largely the absence of any such positive alternative, which places the United party in its present dilemma in providing an effective opposition. The need for such a policy, coupled with the uncertainty as to whether the inspiration for it will be forthcoming from within the Union in the foreseeable future, lends particular significance for South African politics to the progress of the Central African Federation, both economically and towards fulfilment of its partnership ideal. It could well be that in addition to the importance which the successful working out of the Federation experiment holds for the native populations throughout the sub-continent, it might also provide the Union's United party with just that inspiration which could revitalize its programme.

Possibly it is against this background that we should view the extremely far-sighted manner in which the Copperbelt companies in their various ways are approaching their responsibilities in the Federation. Thus on the issue of race relations, whatever may have been the differences of opinion between Anglo American and R.S.T. regarding the short-term tactics to be pursued over African advancement, nobody would question the essentially liberal-minded attitude of both groups towards this problem, and, whatever the difficulties which may arise at subsequent stages, there can be no doubt that the recent agreement between the Chamber of Mines and the European mineworkers provides a definite and encouraging landmark in African advancement.

On the economic front the large mining expansion programme on which both Copperbelt groups have been engaged in recent years under the stimulus of the expanding demand for copper, coupled more recently with their greatly expanded programmes of mineral research, is laying, as did diamonds and gold in the Union, the basis of a mining industry of sufficient magnitude to provide a stable foundation upon which the further industrialization of the territory may proceed.

Within the last year, however, there have been signs of the Anglo American Corporation taking a very much wider interest than this in the Federation's economic future. About a year ago the Corporation undertook to advance £1,000,000 to the Rhodesian railways to finance the purchase of rolling stock, and now comes news of a further loan of £5,000,000, on somewhat original terms, for the same purpose through the agency of the Anglo American Rhodesian Development Corporation (see page 476 for details). It will be recalled that the formation of this corporation was announced last June for the purpose of providing finance for the economic development of the Federation. Although the initial capital has been provided by the Anglo American Corporation and its associated companies (and as such might perhaps be regarded as the reinvestment in the country's economic future of a portion of the group's copper profits during periods of exceptional Copperbelt prosperity), Mr. Harry Oppenheimer has made it clear in a recent statement that the scope of this new financial enterprise will be far wider than that. In fact, Anglo American would appear to envisage making a much larger contribution in this field of public finance through the use which the Development Corporation will be able to make of the group's financial connections and credit for underwriting long-term loans. One such sterling loan for £2,500,000 from the Amsterdamsche Bank N.V., was announced in these columns some few months ago (see *M.J.*, July 15, p. 83) and the raising of further loans of this type are seemingly contemplated.

While the loans which Anglo American have in turn made to the public sector of the economy have so far been devoted to alleviating one of the problems of the railways

(and as such represents assistance in a matter which directly affects Anglo American's interests both at Wankie and on the Copperbelt), there are indications that this is likely to be followed in due course by other loans less directly related to mining and that among the projects in which the Development Corporation may interest itself are the Kariba power programme and the provision of finance to facilitate the establishment of secondary industries. Anglo American's interest in these schemes suggests that, even at this early stage in the Federation's economic evolution, mining —as the pioneer industry—is preparing to play an active part in encouraging the development of a balanced industrial economy.

Here again we have an interesting antithesis, as between the Federation and the Union, in the relationship of mining to secondary industry. In the latter country, where there has always tended to be a conflict of interest between the two, it was only under the compulsion of war-time economics that South African secondary industries developed with any rapidity during the 1940's, and even now the dependence of the Government's fiscal policies on the gold mining industry would probably still continue to sway these in favour of that industry in any major conflict of interest on such fundamental issues as the recruitment of labour, the supply of water, or the incidence of tariffs. It is, therefore, most encouraging to find that section of the Rhodesian mining industry with the closest experience of South Africa doing its part to prevent a similar development in the Federation.

It has long been recognized that the successful development of the Central African Federation could be of the widest economic and political significance throughout the whole of Southern Africa and in the achievement of this it may well be that the Anglo American Rhodesian Development Corporation has a significant contribution to make.

Pattern of Growth in U.S. Base Metal Consumption

Fuller reports are now available of Mr. Charles Ince's speech to the American Mining Congress Convention referred to last week. He painted a very favourable picture of zinc consumption. *Per capita* consumption has improved from 10.2 lb. to 11.5 lb. in the last 25 years and during the first six months of 1955 reached 13.4 lb. The use of zinc in galvanizing is currently running 50 per cent above that for last year which in turn is 10 per cent higher than in 1953, itself a good year. Die casting is fast creeping up behind galvanizing as the chief user of zinc. American die casters are using 48 per cent more zinc this year than last and nearly 40 per cent more than the previous high figure of 1950. Given present prices and stable markets, still greater growth is expected. Mr. Ince then gave his opinion that stockpiling at its present rate would last throughout 1956 and that it was difficult to see the price going below 13 c. (its level at the time of his speech).

However, he did add that die casting, the fastest growing user of zinc, was very price conscious and stability at a fair level was what the industry required for it to forge ahead. This remark throws some light on the curious fact that although the demand for special high grade has been far more intense than that for prime western grade for more than a year, the spread between the two has not been altered. There has obviously been ample justification for a bigger premium on special high grade but it seems likely that the zinc producers feel that use of zinc in die casting is something that will repay a little nursing.

Mr. Ince then went on to give some interesting figures on the use of copper, lead and zinc in the United States. Before the Second World War for every unit on the index of industrial activity of Federal Reserve Board there were consumed 13,000 tons of copper, 12,500 tons of lead and 9,500 tons of zinc. During the last five years these figures per unit have dropped to 10,500 for copper, 9,300 for lead and 7,500 for zinc, a decline of 20-25 per cent. As Mr. Ince points out this is a decline relative to industrial growth but it surely cannot be such a serious matter as he tended to suggest. How soon would American reserves of these three metals run out if the goal were set at keeping the rate of growth of consumption in line with the rate of growth of the entire economy?

Mineralogical Secrets of the Antarctic

Geological exploration carried out in Antarctica during the last two decades has given rise to the strong expectancy that mineral deposits exist in the area. Indeed, two geologically sound conclusions may be brought forward in support of this assumption. The first is that a portion of Antarctica represents an extension of the Andes chain and gives rise to the expectation that the exploitable ores of Bolivia, Chile and Peru may be discovered as a continuation of the South American deposits. The second conclusion is that the greater part of Antarctica consists of crystalline rocks having a direct family connection with those of Africa south of the Atlas range, South America east of the Andes, almost the whole of Australia, and the southern part of India. The realization that these areas, traditionally described as Gondwanaland by geologists, produce some 33 minerals—12 in excess of 50 per cent of world output—indicates that any increasing attention afforded to Antarctica in the field of geological exploration might be well rewarded.

The departure of the 900 ton survey ship *Oluf Sven* for the Antarctica on Tuesday of this week is, therefore, of marked interest. The purpose of the visit is to carry out a very extensive aerial photographic and geological survey of the Grahamland Peninsula, the nearest continental tip to the expedition base at Deception Island and thence to the most southerly capes of South America. In addition to the *Oluf Sven* expedition, during the Antarctic summer an advance party of the separate Commonwealth Trans-Antarctic Expedition will reconnoitre in preparation for the planned crossing of the continent in 1957-58.

The *Oluf Sven* survey is the first of its kind to be carried out in Antarctica, and has been commissioned by the Colonial Office on behalf of the Falkland Islands Dependencies. The purpose of the survey is to obtain vertical air photographic cover of approximately 50,000 sq. miles and, using the data thus obtained, to revise and supplement existing maps. Geophysical surveys will be flown in weather unsuitable for aerial photography. It appears logical to assume that immediate mineralogical interest will centre on possible deposits of high value in relation to bulk, owing to the obvious costs of any feasible exploitation in this remote area.

The survey will be conducted by Hunting Aerosurveys Ltd. in collaboration with its associate, the Photographic Survey Corporation of Toronto. Also participating is International Aeradio, which will be responsible for the installation, maintenance and certain operational aspects of all communications and navigational aid equipment for the aircraft, the base headquarters and the survey groups.

It is anticipated that the survey will not be completed in one season, although it is hoped that approximately 200 hours of flying time will be logged per aircraft. These hopes, however, will naturally depend on the climatic conditions encountered before April, 1956, when the Antarctic winter will close in to cry temporary halt to any activity on the part of the expedition.

The aircraft used in the operation will be two twin-

engined Canso amphibians operating from the British Meteorological Station on Deception Island, 80 miles from the north-west tip of the peninsula. A Westland S-51 helicopter will also operate from the deck of the *Oluf Sven*. Including the cameras to be used, an airborne magnetometer and radiation detector will be employed in the geophysical reconnaissance. In operation, the preparation of maps and aerial photographs will be facilitated by ground survey teams who will fix control points. The helicopter will transport the survey teams in groups of two.

The expedition is expected to reach Deception Island on or about December 1, 1955.

Western United States

(From Our Own Correspondent)

Portland, Oregon, October 10.

General disappointment has been felt in the industry over the President's veto of HR 6373 to extend and increase Government purchasing of asbestos, beryl, chromite, columbium-tantalum, manganese, mica and tungsten. The Bill was considered to be in line with the report of the President's Committee on Mineral Policy and passed both Houses of Congress by large majorities. The Office of Defense Mobilization has terminated accelerated amortization for new mines and plants on all minerals except copper, mercury, nickel and selenium.

COPPER PRODUCERS' ACTIVITIES

Plans for new copper production in the Ely, Nevada, district are definitely moving in a large way. The principal operators are Consolidated Coppermines and Kennecott's Nevada division. Kennecott has been developing a 20,000,000 ton ore body at its Veteran pit and preparing for underground mining at the Deep Ruth, formerly an open pit operation, both of which are now ready for production. Coppermines is now ready at its Tripp open pit which is expected to yield 20,000,000 to 25,000,000 tons. Surface area of the two pits will be in excess of 150 acres. While these developments will add materially to the lives of the mines increased production is not contemplated at present. Heretofore Coppermines has been contracting its stripping and mining, but with the additional ore reserves proven will carry on this work as a company operation.

At its Ray division in Arizona Kennecott has awarded a contract for a $4,700,000 alteration and addition to its mill at Hayden. The present plant is a concentrator which is effective only on the sulphide ores and incurs some loss on those which have an oxide coating. The new plant will combine flotation with leaching and precipitation and is expected to recover an additional 2 lb. of copper per ton. Acid for leaching and iron for precipitation will be recovered from the mine's own pyritic ores.

At Butte, Montana, Anaconda has commenced production from the 1300 level of its Kelly mine, principal unit in its Greater Butte project. Heretofore production has been from the 600 level where a gravity draw system is employed but on the 1300 cars will be loaded from concrete slusher drifts. Block caving is used throughout. The Kelly No. 2 shaft is being raised from the 3000 level to connect with the present shaft on the 2400.

At the Pima mine in Arizona preparations are under way for development as a large low-grade producer. Pima has an interesting story. The ore body is masked by 200 ft. of alluvium with no outcrops of any kind but geological study indicated the possibility of the extension of known ore bodies into the area. A geophysical survey confirmed this possibility and drilling proved the existence of an ore body of such grade that in the subsequent development work it paid most of the expense of a 600 ft. shaft and 2,500 ft. of laterals.

THE LIGHT METALS

Anaconda marked its entry into a new field when it started its aluminium plant at Great Falls, Montana, in August, the first new aluminium plant to be constructed in the country since 1946. Capacity is rated at 60,000 tons annually when full production is reached early in 1956. Alumina is obtained from bauxite which is shipped in from Texas and the British West Indies but Anaconda states it has developed a process for the manufacture of alumina from domestic clays and will build a plant in the Spokane, Washington, area for this purpose. The location was chosen because of its proximity to a pipe line under construction to bring natural gas to the Northwest from New Mexico and Canada.

Ambitious plans for expansion are under way throughout the aluminium industry. Reynolds Metals Co. has announced plans for increased production from both plants and mines which will give it an annual output of 550,000 tons, an increase of 135,000 tons. This will involve a new plant of 100,000 tons capacity in the Ohio Valley.

Alcoa plans an alumina plant on tidewater at Matagorda Bay in Texas provided the Government will dredge a navigation channel which will enable it to deliver its Caribbean and South American ores without re-handling. Revere Copper and Brass Co. has announced it will build a 60,000 ton plant at Wenatchee, Washington, and Kaiser Aluminum is negotiating for a plant at New Orleans which will have a capacity of 90,000 tons. Harvey Machine Co. has received Government approval for construction of an aluminium plant at The Dalles, Oregon, to have an annual capacity of 270,000 tons. Harvey pioneered the plant at Great Falls and after doing the spade work sold out to Anaconda.

URANIUM PRODUCTION

The State Mining Commissioner of Colorado reports that production of uranium within the state in 1954 amounted to $118,000,000.

U.S. Vanadium Co., a subsidiary of Union Carbide and Carbon Corporation, has relinquished that name to become an integral part of the newly formed Union Carbide Nuclear Co. The latter has signed a contract with A.E.C. for expansion of the mill which U.S. Vanadium had operated at Uravan, Colorado, since the days when it was constructed for the treatment of vanadium ores and uranium was considered an undesirable by-product.

Work is practically completed on A.E.C.'s $2,000,000 project for enlarging and modernizing its processing facilities at Monticello, Utah. The programme includes a complete new mill and many changes in the old, originally built to treat vanadium ores and one of the first to process uranium.

Since the Geneva Conference there has been some speculation as to whether thorium may displace uranium as a source of nuclear fuel but the opinion of leaders in the atomic energy field seems to be that there will be no serious threat to the position of uranium. A.E.C. prices are guaranteed until 1962, six large industrial reactor plants "tailored" to uranium are under construction and A.E.C. is building new treatment plants and enlarging old ones. So far as present research goes thorium is fissionable only when used with U-235 and it is predicted that by 1962 uranium will be in greater demand than ever.

Ion Exchange Processes for Gold Recovery

Gold is normally recovered from cyanide solutions by precipitation with zinc dust. This method can be applied cheaply and simply to a large number of ores, but problems are sometimes presented by the high proportion of slimes, which makes filtration difficult and expensive, or by the presence of elements soluble in cyanide solution, which form complexes and inhibit the precipitation of gold. For several years the Chemical Research Laboratory of the Department of Scientific and Industrial Research has been interested in the possibility of adsorbing gold from cyanide solutions by the use of ion exchange resins, and the investigations are described in the following article.

The strongly basic resin, Amberlite IRA-400, was originally selected for this investigation, which was extended to include a study of the behaviour of other metals such as silver, copper, iron, cobalt, nickel and zinc, and also of anions other than cyanide, such as sulphate, thiosulphate and thiocyanate, which are likely to occur in commercial cyanide solutions.

All the heavy metal complex cyanides examined, including gold, were strongly adsorbed by the resin. When pure solutions of aurocyanide were used up to 0.66 gram of gold were adsorbed per gram of dry resin. The affinity of the resin for gold was unaffected by the presence of sulphate, but was decreased to some extent when thiosulphate or thiocyanate were present.

Amberlite IRA-400 permits selective elution of the adsorbed cyanide complexes by various eluting agents. Many adsorbed cyanide complexes, particularly gold and silver cyanides, proved difficult to elute, but this problem was solved by the use of organic solvents containing mineral acids. On the other hand, many complex cyanides other than gold could be removed with normal aqueous eluting agents. A procedure was therefore developed by which metallic cyanides other than gold are removed by elution with aqueous solvents which remove no gold. The gold is subsequently removed from the resin with an organic solvent and recovered as a high grade concentrate. The resin is then in a suitable condition for undergoing a further adsorption cycle.

USE OF SYNTHETIC PREGNANT SOLUTIONS

Experiments using synthetic pregnant solutions indicate that selective desorption of the complexes adsorbed on the resin might be obtained by the use of four eluting agents. A solution of 0.2N hydrochloric acid elutes nickel and zinc with traces of copper. The next step is elution with 1N sodium cyanide, which removes iron and copper. A mixture of acetone with 5 per cent hydrochloric acid (density 1.18) then removes gold and silver. Periodic treatment of the resin with 2N potassium thiocyanate might be necessary to remove cobalt and traces of silver.

The yield of gold obtained by this treatment was better than 98 per cent and the recovery of silver amounted to 80 per cent. The remaining gold and silver was still adsorbed by the resin. In subsequent experiments a further adsorption stage was carried out immediately after eluting with the aqueous reagents, this cycle being repeated until a sufficient quantity of gold had been adsorbed by the resin to justify using the organic solvent. This modification led to a considerable saving in the solvent and resin required for a given volume of pregnant solution. About 99.5 per cent of the gold and 100 per cent of the silver were ultimately eluted from the resin with the acetone solvent.

A similar treatment was carried out on a pregnant solution obtained by the cyanidation of a low grade ore. The solution contained only 1 p.p.m. of gold and its copper content was a hundred times greater. On elution with an acetone-hydrochloric acid mixture 95 per cent of the gold was recovered, the rest being retained on the resin.

These experiments were described in a paper presented as part of a Symposium on Nonaqueous Applications of Ion Exchange organized by the American Chemical Society.[1]

Mixtures of methyl alcohol and hydrochloric acid have since been investigated as possible eluting agents with a view to replacing the acetone by a cheaper and more readily recovered solvent. A mixture of methyl alcohol with 18 per cent by volume of hydrochloric acid (density 1.18) proved to be a very good eluting agent, although not quite so efficient as acetone-hydrochloric acid mixtures.

The amount of gold in the resin was found to be an important factor in the elution stage. If the loading of gold on the resin is not greater than 0.1 g. Au/g. resin, then gold is not eluted by sodium cyanide solution, but if the amount of gold exceeds this figure, some degree of elution does take place. The quantity eluted increases with leaching until at saturation of the resin with gold some 60 per cent of the absorbed gold may be removed.[2] The elution of silver cyanide is analogous to that of aurocyanide in that, providing the loading of silver on the resin does not exceed 0.5 mg. equivs. per g., no silver is eluted with normal silver cyanide. A number of experiments indicate that the strong retention of small loadings of gold and silver is related to the degree of cross-linking of the resin.[3]

The process described has been patented by the Chemical Research Laboratory. It has given highly encouraging results on a laboratory scale and is potentially attractive for the treatment of pregnant liquors from which a satisfactory recovery of gold cannot readily be achieved by the existing zinc process. A further advantage of any ion exchange process is that if it is operated on a resin in pulp basis, there is no need for expensive filtration equipment. It is undoubtedly possible to recover other valuable metals, such as copper, nickel and cobalt, which are adsorbed on the resin. The proceeds from these by-product metals might well be sufficient to pay for the process. Furthermore, production costs should be favourably affected by the greater purity of gold recovered by ion exchange methods.

By multicycle operations the concentration of gold could be built up on the resin, thus minimizing the volume of organic solvent required. Providing hydrochloric acid was used, the organic solvent could readily be recovered for further use.

AN IMPROVED METHOD

Pilot plant operations are obviously necessary before any assessment of the economics of the process can be made, and these are now in progress. A small pilot plant built by a British manufacturer to operate the process has been running for nearly a year on a gold mine in Southern Rhodesia. Recovery has recently been started at a second and larger plant, from which it is hoped that all necessary data will be obtained.

A disadvantage of this method is that the metallic cyanides are adsorbed before the gold, which moves down to the bottom of the column. Workers at the Chemical Research Laboratory have developed a much improved process in which the reverse occurs.

The new method, which should be cheaper and more simple to operate, is based on the fact that a weakly basic (dimethylamine) resin will adsorb gold from a cyanide solu-

tion in preference to other metals, such as nickel or copper, which are normally present in much larger quantities.

The resin first used for the improved method was De-Acidite " H ", which contains $-N.CH_3$ groups, plus a high percentage of strongly basic groups as impurities. A similar resin was prepared in the Chemical Research Laboratory, which contained only 4.9 per cent strongly basic groups, and finally a resin designated " AXI " and containing only 1.5 per cent strongly basic groups was developed.

If a solution containing the following ions, $Au(CN)_2$, $Ni(CN)_4^{-2}$, $Cu(CN)_3^{-2}$, and $Fe(CN)_6^{-4}$, is passed through a long column of resin, it is found that the gold is absorbed in a band at the top of the column and the other metals move down the column at varying speeds according to their affinities for the resin. If the solution is passed through the column until breakthrough of gold occurs, most of the base metals will have been removed in the barren liquor and the resin will contain gold together with only a small percentage of impurities.

Starting with a solution containing :

6 p.p.m. Au
24 p.p.m. Fe
40 p.p.m. Cu

in 0.015 per cent excess NaCN at equilibrium a typical analysis of the " AXI " resin will give :

17.00 mg Au
16.00 mg Ni
0.12 mg Fe
0.70 mg Cu

The pregnant liquor, containing sodium aurocyanide, $NaAu(CN)_2$ and complex cyanides of the other metals is passed through two columns of the weak base resin. The column heights are adjusted so that the first is loaded to capacity with gold when gold breakthrough occurs in the second. When the columns are fully loaded with gold they are eluted with 2N sodium thiocyanate and the gold is recovered from the eluate by electrolysis at 1.6 v. Any silver present follows the gold and is plated out with it, together with part of the copper. Gold of about 95 per cent purity is obtained from the electrolysis, using only one absorption and elution stage.

By using three columns the process can be made continuous.

REFERENCES

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Medical Care of African Mineworkers

The death rate of native mineworkers on the Transvaal gold mines of the Anglo American Corporation of South Africa group has dropped 70 per cent in the past 18 years, due largely to improvements in feeding, medical care and housing. In 1937 the death rate was 5.52 per 1,000 natives while in 1954 the rate was only 1.55 per 1,000. This is indicated in the annual report for 1954 of the medical consultant to the Corporation, Dr. J. H. G. van Blommestein.

The methods employed to ensure the maximum welfare of the native labour force are general throughout the South African mining industry. The vastly-improved statistics relating to native mortality and disease which have resulted from the application of these methods likewise are not confined to the Anglo American Corporation alone, as all mining Groups in South Africa regard native health and welfare as of primary importance and in consequence all groups employ medical organizations to ensure the maximum well being of their native employees.

EXAMPLE OF MEDICAL ORGANIZATION

Yet the standards set by the Anglo American Corporation may be taken as a revealing example of what is being done. It is, therefore, of interest that the medical organization of the Corporation, which serves its gold, diamond, copper and coal mines in Southern Africa, has 19 hospitals with 2,915 beds and employs 50 full-time doctors.

In the hostels on the new Anglo American mines of the Orange Free State, only 10 men are accommodated in each room. The greater floor space per individual thus reduces the risk of a spread of infectious diseases. The feeding schedule that has been drawn up not only conforms to the standard of a well-balanced diet for men performing hard physical work, but at the same time does not infringe on any tribal customs and prejudices.

The diet schedule as laid down by the Medical Department of the Group aims at giving the African worker between 4,000 and 4,200 calories per day. The main food constituents are arranged in their correct proportions and the protein content is considerably in excess of international standards. Although Africans in their natural state are not partial to vegetables, they readily consume 87.5 lb. per 100 natives per day. Avitaminosis is unknown among more than 82,000 African workers who are fed from the kitchens of the Group.

IMPRESSIVE STATISTICS

In 1940 it cost £7.67 per annum to feed a native mineworker. The cost rose to £19.568 in 1954. During the year the Transvaal and Orange Free State mines of the Group spent £367,240 on meat and offals, £127,395 on vegetables and £252,655 on maize products.

Rates for infectious disease were higher in 1954 on the mines of the Group in the Orange Free State. This is accounted for by the fact that a large percentage of workers are recruited from tropical areas where the vast majority are not immune to such diseases as measles, mumps and chickenpox. Union natives have greater immunity to these diseases.

In so far as lost-shift statistics are concerned, the standard attained in the Group can be regarded as extremely satisfactory. The combined lost-shift rate per native per annum for disease, accident and other causes was 3.76 per 1,000. This is better than the average figure of 8 for industry as a whole in the United States.

The mortality statistics for the Group show that the greatest number of deaths arose from diseases of the heart and pericardium (29), followed by 26 deaths caused by pneumonia, broncho and lobar diseases, and 19 deaths due to carcinoma and sarcoma. There were only three deaths from tuberculosis of the lungs and nine deaths from other forms of tuberculosis. The disease mortality rate, at 1.55 per 1,000 natives on the Reef gold mines of the Group, was the lowest ever recorded.

Similarly, the disease mortality rate at 2.13 per 1,000 on the South African collieries of the Group was the lowest recorded for these collieries, and the disease death rate on the diamond mines at 0.58 per 1,000 was the lowest recorded for 14 years. On the copper mines in Northern Rhodesia the death rate due to disease was 1.15 per 1,000.

U.S.A Faces Up to Its Minerals Problem

Two weeks ago we discussed in these columns the need for a British mineral resources policy, last week under "Notes and Comments" we gave some recent illustrations of the much more realistic attitude to this same problem in the Un ted States. Now, to give readers some idea of how the Administration is tackling the problem at top level through the Cabinet Minerals Policy Committee, we quote extracts from a recent speech by Mr. Felix Wormser, Assistant Secretary for Mineral Resources at the Department of the Interior. He was addressing last week's Convention of the American Mining Congress.

The Cabinet Minerals Policy Committee, in its latest report, recommended that periodically our defence position in each strategic material be evaluated, and that for each commodity a comprehensive programme shall establish the level of domestic production to be maintained, set up measures to achieve it, and specify the quantity which must be stockpiled.

The Committee conceived of the development of these comprehensive commodity programmes as a part of our overall defence. The Committee was not satisfied that adequate readiness measures existed in the fields of minerals and metals, and recommended that the Office of Defense Mobilization take another look at the mobilization jobs to be done and issue whatever delegations of authority are necessary to assure full coverage of mobilization planning. Secretary McKay, in his speech to the Convention, spoke of the delegation to the Department of the Interior of analyzing, case by case, each strategic mineral and metal and recommending courses of action to strengthen the mobilization base.

OFFICE OF MINERALS MOBILIZATION

This delegation became effective in November of last year and we in Interior set about implementing it. The Secretary established the Office of Minerals Mobilization; the Congress appropriated funds for its operation effective July 1 of this year.

Fourteen advisory committees representing 14 commodities have been organized. Through these advisory committees the Department hopes to get substantial assistance from the mining industry in the implementation of the salient features of minerals policy set forth by the Cabinet Committee.

When we turn to the section of the Committee's report dealing with the development of domestic mineral resources we find the emphasis is upon an orderly development and wise use of the Nation's resources.

To achieve this orderly development and wise use the Committee recommended that the programme of financial assistance to mineral exploration now administered by the Defense Minerals Exploration Administration, through matching private and Government funds, be strengthened and continued; that Federal agencies accelerate activities such as topographic and geologic mapping; that exploration for materials in short supply be expanded; and that the Department intensify its programme of mineral and metal research.

These recommendations, of course, fall heavily upon the shoulders of the Department of the Interior. To the extent that we are able to carry them out, to that extent we shall make available much useful scientific and practical data to the mining, smelting and refining industries.

The Department has already re-examined its organization, personnel, and budget structure in the light of these recommendations and has made progress in formulating a programme to carry out these enlarged functions.

The report does not propose any formula by which various problems affecting the industry might be solved. It does not deal specifically, for instance, with the problem of competitive imports, it does not discuss price supports or quotas of the type used in agriculture; nor subsidies such as those now made to certain shipping and transportation segments of our economy. The report reflects on the whole the belief of this administration that Government interference in business and in markets is in the long run a retarding influence on our economy.

It does—and I should like to emphasize this—leave the door open for any assistance necessary to establish a sound mobilization base. The language of the report is "the best use of all of the various existing authorities of the Government . . . to maintain or achieve that level of domestic production. . . ." If necessary, additional legislative authority is to be sought from the Congress.

It is too early yet to know to what extent measures employed solely in the interests of security will assist the domestic mining industry. It is difficult in the times in which we live to distinguish between security measures, and those designed to promote the general welfare. Economic strength and military preparedness are closely related. We must, nevertheless, recognize that the problem of war-time minerals supply and providing minerals for a growing economy are of different dimensions. The Federal Government must do all necessary for security—its influence on the play of economic forces must be held to a reasonable minimum.

SEARCH FOR MINERALS AND RESEARCH ON METHODS

One real problem faced by the domestic mining industry to-day is the depletion of its easily accessible high-grade reserves, the substantially increased costs of mining and the difficulties encountered in the search for and mining of deeply buried ore deposits. These conditions are unlikely to improve unless geologic research and investigations help to reveal new presently unknown commercial deposits, and research develops improved technology in the treatment of submarginal ores, such as the superb projects in the iron range in Minnesota to utilize our taconite reserves.

The President's Committee felt that one of the important contributions to be made by Government is the stimulation of research and the development of technology.

These then are the objectives of minerals policy; to strengthen our security position in metals and minerals, to achieve an orderly and wise development of our Nation's mineral resources, and to improve Government-industry relations in the minerals field.

MINERS MUST STUDY MARKETS

Miners, especially those who ship concentrates to custom smelters, in their intense preoccupation with operating problems, often show little concern over the market for their end product. In our highly competitive economy each metal faces intense competition from other metals, and from plastics especially. I am sure that miners would be repaid handsomely if they studied the outlets for their products and the competitive position each occupies. They would discover that consumers have the last word and that markets are sensitive affairs which cannot stand Government tampering. Thus my constant plea to have faith in the competitive market.

Winning Brown Coal by Bucket Wheel Excavator

Claimed by the manufacturers to be the largest machine of its kind in operation anywhere in the world, a bucket wheel excavator is winning brown coal at the opencast Fortuna mine of the Rheinische Aktiengesellschaft für Braunkohlenbergbau und Brikettfabrikation, Germany, at a daily output of 100,000 cu. m. solid measure. The manufacturers, Orenstein-Koppel und Lübecker Maschinenbau Aktiengesellschaft, consider that by use of the bucket wheel excavator, together with further excavators of the same size, the winning of brown coal by opencast mining will be made possible to depths of 250 metres. A feature of the machine, which is described in the following article, is that loading operations are carried out simultaneously with spoil removal. It should, of course, be borne in mind that the impressive outputs of the bucket wheel excavator have been achieved in soft faces, namely light overburden and brown coal deposits.

The bucket wheel excavator at present in service at the Fortuna opencast brown coal mine in Germany, is claimed as the largest unit of its kind in the world. Excavating and loading simultaneously, the excavator removes 100,000 cu. m. of spoil in one day of operation and in theory during the same period could fill the holds of 55 modern sea-going motor cargo vessels each with a carrying capacity of 4,500 tons.

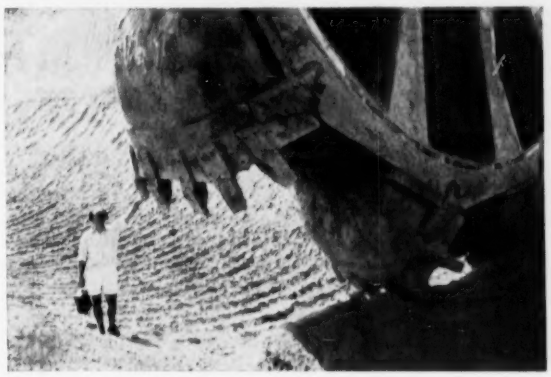
These output statistics are impressive, notwithstanding the fact that the machine removes only soft materials such as light overburden and brown coal deposits.

Owing to its dual-purpose of excavating and loading at the same time, the bucket wheel excavator is constructed in three main parts. These parts comprise the bucket wheel excavator itself, the connecting bridge approximately 80 m. in length, and the loading plant which moves on caterpillars.

The machine is a bucket wheel excavator without thrust forward, in which the jib carrying the bucket wheel can be raised at a speed of 10 m. per min. and lowered at a rate of 5 m. per min. (measured at the axle of the bucket wheel) by means of a rope winch acting round a horizontal tipping joint on the carrying frame. The unit has a maximum length of 200 m. and a maximum constructional height of 66 m. while its service weight, including that of the loading plant, amounts to 5,600 tons. It is taken that the spoil in the bucket wheel and on all conveyor belts weighs approximately 170 tons.

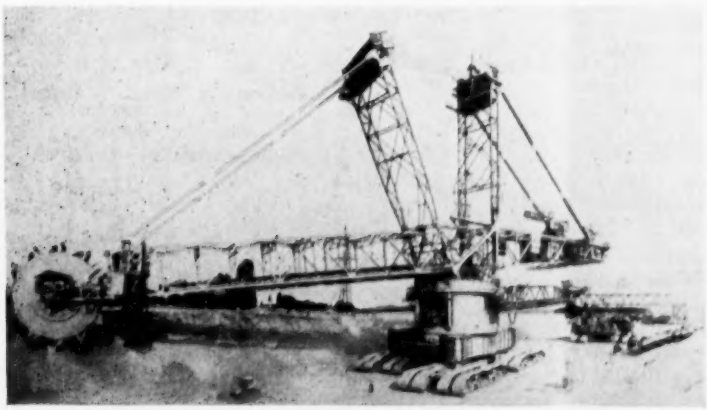
MACHINE DIMENSIONS

The bucket wheel has a bucket lip circle of 16 m. dia. and is equipped with 12 buckets, each of 3.6 cu. m. cubic capacity. This bucket wheel revolves at 2.3 r.p.m., emptying 27 bucket loads during that period. In operation, the spoil excavated by the bucket wheel is brought to the loading plant by way of seven belt conveyors equipped with rubber belts of 2,600 mm. width and thence is loaded constantly into the overburden trains. Two normal gauge tracks are arranged below the loading plant, travelled by electrically driven overburden trains having automatic tipping devices with a capacity of 96 cu. m. These tippers are built to the design of the manufacturers' affiliates, Orenstein-Koppel und Lübecker Maschinenbau Aktiengesellschaft, Dortmund.



The bucket wheel

The bucket wheel jib is suspended from the excavator frame by a 24-rope block. Two steel wire ropes with a diameter of 59 mm. lead to the hoisting winch. The hoisting winch and block have two suspension systems independent of each other, tooth wheel reduction gears arranged symmetrically and in duplicate, brakes and motors. This means not only a maximum of safety, but that when a defective hoisting winch rope has to be replaced, no supporting measures are necessary. At the end of the counterweight girder of the excavator's superstructure there are, in addition to the hoisting winch, approximately 310 tons of counterweight, so that the total centre of gravity of the excavator superstructure can swing around the excavator's turning axis under varying conditions of load.



General view of the bucket wheel excavator

MOVEMENT OF SUPERSTRUCTURE

The excavator's superstructure swings on a ball path of 15 m. dia., in the running circuits of which 156 carrying balls of hardened ball-bearing steel with a diameter of 150 mm. move in oil. Between each two load-carrying balls there is a separation ball of 148 mm. dia. This ball path not only transmits the vertical forces, but also all horizontal ones. Only in this way is it possible to use the entire empty space formed by the framework of the excavator to accommodate the conveying structures. As the plant is intended for winning coal, a mobile coal crusher is provided in the framework of the excavator's superstructure,

which can be automatically removed from the work cycle when overburden is being excavated. The object of this equipment is to limit the incidence of the maximum size of pieces of coal to 500 mm.

Between the excavator superstructure and the undercarriage carrying the crawlers there is a cylindrically formed central portion, supported on a ball ring on the undercarriage. This intermediate structure makes it possible to slew the loading plant through 360 deg., so that the employment of the conveyor system is in no way restricted.

Both excavator and loading plant move on crawlers. The excavator itself stands on three crawler units with a total of 12 crawler bands, having a maximum length of 15.2 m. between the return sprocket wheels. The two crawler units lying behind each other can be adjusted to curves by means of giant spindles, so that the excavator can travel not only in a straight line, but also in curves down to a minimum radius of 50 m. The total surface of all crawler tracks in contact with the ground amounts to approximately 456 sq. m., so that in spite of the size of the plant an average specific pressure of only 1.25 kg/cm² is exerted. The crawler tracks are composed of 924 treads, and on to these chain links are welded, which act as a path for the 192 load-transmitting rollers. The chain links themselves are drop-forged, and a tensile strength test on the chain links welded to the treads has shown that a tractive force of 300 tons on the chain bolt eye is insufficient to cause lasting distortions or cracking. The treads are of welded hollow box construction and are formed by the drop forge process.

Nine of the crawler tracks are driven by motors through dust-tight and watertight tooth wheel reduction gears, so that the travelling speed can be varied at will and without stepping to a maximum of 10 m. per min. The majority of the tooth wheel reduction gears are equipped with pressure lubrication, and in so far as grease lubrication is provided, it is centrally controlled by means of a Helios automatic hydraulic grease system.

In order to minimize the constructional weight and thereby the specific pressure, all constructional parts are made of Siemens-Martin steel of quality No. 52 (DIN). Use was made of welded construction as far as this resulted in economical advantages. In the case of portions exposed to dynamic forces, these were all annealed at a temperature of approximately 625 deg. C. to remove the internal stresses.

To simplify maintenance various cranes are mounted on the excavator, e.g. a travelling electric 4-motor revolving crane with travelling crab, for a maximum hook load of 15 tons, on the upper connecting girder of the counterweight construction.

LOADING PLANT

The loading plant is connected to the excavator by an intermediate bridge of approximately 80 m. length, which carries the conveyor belt. Adjustment through ±6.5 m. in the intermediate part of the excavator and the statically conditioned support of the intermediate bridge make it possible to move both parts in vertical and horizontal elevation in completely different path levels.

The capacity of the loading plant allows a maximum of 2 cu. m. per sec. of spoil to pass uninterrupted to the loading plant. Two reversible loading belts, adjustable in the running direction of the belt and only separated by a saddle chute, are carried in a crane carriage moving in the framework of the loading plant at ±1.5 m. and following the crane in the direction of travel. A conveyor belt, slewable in the horizontal plane, loads the spoil by choice on to one or other of the two belts. This method makes it possible to bridge the space between the wagons as well as between the tracks.

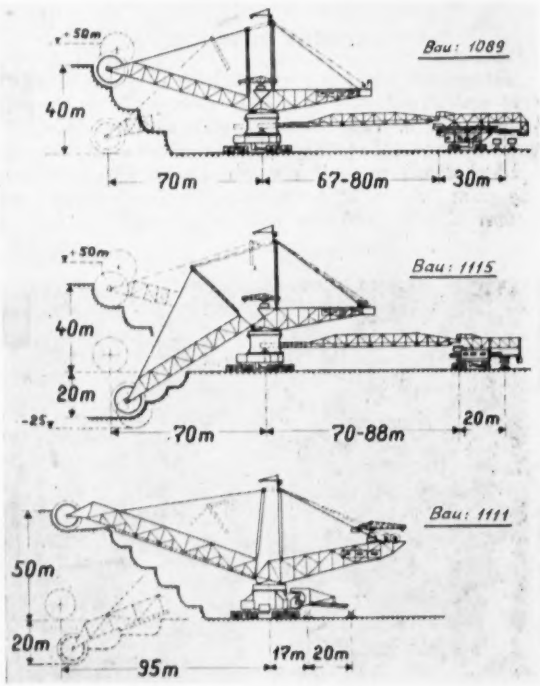
The total length of the conveyor belt system, i.e. the sum of the distances between drum centres, is 185 m. The belt speed is approximately 3.5 m.p.s., the width of the rubber conveyor belts 2,600 mm. and the inclination of the lateral idlers of the three-part upper carrying idlers 30 deg., a factor that gives a large filling section of the belt.

OPERATION OF THE EXCAVATOR

The working of the excavator is controlled by the driver from one of the two driver's stands at the bucket wheel. The height of each of these stands can be adjusted up to approximately 6 m. by means of a rope winch. Each of the two loading tracks is served by one of the two loading supervisors in the loading plant. At the same time these men control the locomotives of the overburden or coal trains by means of ultra-short wave radio. The excavator driver and the loading supervisors are in constant intercommunication. A further two or three men are available for the control of the mechanical and electrical equipment, so that only five or six men are needed to operate the entire plant. Through three shifts and with an uninterrupted net working time of 19.4 hours, the excavator has a capacity of 100,000 cu. m. solid per day.

The excavator has been so designed that blocks of 40 m. height and 89 m. width can be excavated in segments lying one below the other, each having a height of 10 m. and a depth of 19.2 m. When excavating, each segment of the bucket wheel jib is swung through an arc in the horizontal plane. If the arc for each segment at a lower level is suitably shortened in relation to the one above it, the remaining terrain facing the excavator lies on a slope of 36 deg., so that even with bad ground conditions any sliding of the high slope is hindered.

Each individual bucket cut of approximately 1.2 m. depth



Operational cycle of the excavator

is set by driving the excavator forward on its crawlers. This cycle is repeated until the maximum segment depth of 19.2 m. is reached. The fact that the complete excavation cycle for one segment is carried out entirely automatically must be regarded as a new solution of the problems involved.

Once the setting of the limit positions, cutting depth, slewing and travelling speed and the switching to automatic working have been made, button pressure is sufficient for the operation of excavating a complete segment to proceed automatically. From the mining point of view, therefore, care must be taken to ensure that the excavator always contends with the same cutting conditions.

ELECTRICAL EQUIPMENT

The electricity consumption of the excavator is equivalent to that of a medium-sized industrial town of approximately 60,000 inhabitants (connected load 10,300 kVA). The current, with a tension of 25,000 v. (A.C. 25 kV, 50 cycles) is fed to the plant by way of a flexible rubber-clad cable, 1,500 m. in length. The high tension current is stepped down to 3,000 v., 500 v. and 220 v. in 11 transformers located on the excavator (total capacity 10,900 kVA). Two emergency lighting batteries with a total of 300 Ah feed the emergency lighting plant with 110 v. D.C. in the event of the internal net voltage failing.

There are approximately 120 drives. These include the bucket wheel (2 motors), each 525 kW, 3,000 v.; the bucket wheel belt (2 motors), each 500 kW, 3,000 v. The bucket wheel jib is raised and lowered by a winch driven by two Ward Leonard motors with a total of 1,300 kW. Two 1,500 r.p.m. Ward Leonard transformers with 900 v. D.C. are also fitted.

The travelling mechanism of the excavator has nine 100 kW D.C. motors with Ward Leonard control (2 transformers as for the jib winch).

The movement of the loading belts in and across the axis of the tracks and the slewing of the relevant feeding belts is effected by means of separate Ward Leonard drives controlled by a common induction transmitter. The simultaneous running of the loading belts and of the slewable feed belts, when moved in the direction of the tracks, is achieved by a Ward Leonard control, which works as correction link on the exciter machine of the belt slewing mechanism.

FACTOR OF DEVELOPMENT

As the bucket wheel excavator is not intended only for the removal of overburden but also for the winning of brown coal, it is necessary that the irregular roofs of the coal seams be worked in a clean line finish and that the overburden be separated from the coal. This operation, now being successfully carried out at the Fortuna mine, is almost unique in Germany and may be said to provide the impulse that has furthered the development of the bucket wheel excavator. A further advantage of the bucket wheel excavator is the separation of excavating work from transportation, by which means the wear previously experienced by the chain of the bucket chain excavator is eliminated. It is interesting to note that the running costs due to wear of the bucket wheel excavator are considerably lower than those of the bucket chain excavator.

The design and construction of the mechanical portion of the excavator was completed in the Lübeck shops of Orenstein-Koppel und Lübecker Maschinenbau Aktiengesellschaft, while design and production of the electrical portion were by Allgemeine Elektrizitäts-Gesellschaft. Specialist engineers were the Rheinische Aktiengesellschaft für Braunkohlenbergbau und Brikettfabrikation, Cologne, The plant was assembled in about 1½ years.

Reviews

Tin 1954 : A Review of the World Tin Industry. *Published by the International Tin Study Group. Pp. 56, including 26 charts. Price 7s. 6d. or U.S. $1.00, or equivalent, post free from the Group.*

Statistical Supplement, 1955. *Published by the International Tin Study Group. Pp. 90. Free to purchasers of the "Statistical Year Book, 1954 : Tin, Tinplate and Canning". To all others, 12s. 6d. or U.S. $1.75, post free from the Group.*

All the main developments in the world tin and tinplate industries over 1954 and part of 1955 are covered in this latest review. *Tin 1954* summarizes the position in each of the main tin-producing and tin-consuming countries.

The prospective International Tin Agreement (although not yet fully ratified) undoubtedly had an important influence during the period in keeping actual tin prices stable. The review contains an illuminating chart as to the relationship between the various price levels at which the proposed buffer stock must, must not or may operate and the actual price movements of 1952-54.

On the tinplate side, production during the period was at a record level, and reference is made to the remarkable increases in production in the U.S.A., France, Belgium and other countries. The review is optimistic about the future rate of consumption of tinplate.

The tin position both of the world as a whole and of individual countries is brought up-to-date in the supplement, a comprehensive collection of statistics covering 120 countries.

Geology and Mineral Deposits of Aiken Lake Map Area, British Columbia, *by E. F. Roots. Geological Survey of Canada, Memoir 274, published by the Canadian Department of Mines and Technical Surveys. Pp. 246 with maps, illustrations and index. Price $1.00.*

The Aiken Lake, British Columbia, map area extends westwards from the Rocky Mountain Trench to include the crest of Swannell Ranges and the mountains underlain by the Hogem batholite, and embraces a characteristic part of the Omineca Mountains of the northern interior of British Columbia. Deposits of base and precious metals have been found in many places within the map area.

The report under notice is a concise and revealing document, based on field work in the map area from 1945 to 1948 inclusive, and compiled in the light of recent investigations of areas to the south and west. Descriptions of the rocks and their structures as well as interpretations of their correlations and history are presented in this work in greater detail than might ordinarily be required.

List of Books and Pamphlets. *Published by Industrial Distributors (Sales) Ltd. Pp. 63. Free on application before January 1, 1956.*

The pamphlet under notice comprises a supplement to the list of books and pamphlets in the library of the Industrial Diamond Information Bureau, first issued in 1952. Originally, it was the intention of the Bureau to publish annual supplements, but this could not be realized.

The present supplement is also arranged according to the UDC, and appendices give new Reports of Investigations and information circulars of the U.S. Bureau of Mines, reports of wartime agencies and a list of Russian books and translations available in the library.

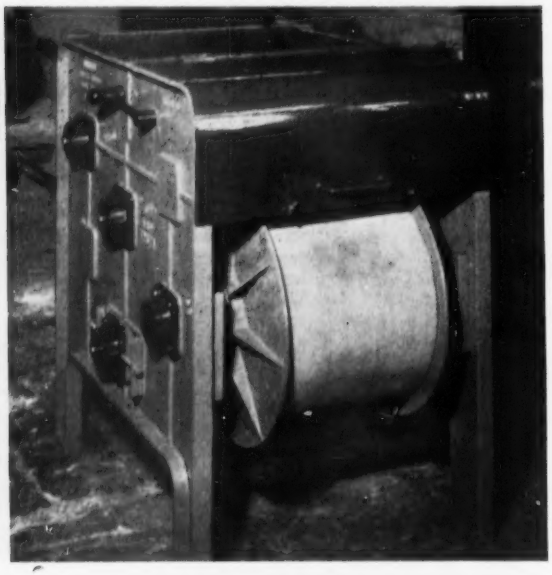
MACHINERY AND EQUIPMENT

A Drum Magnetic Separator

The Model 40 drum magnetic separator for the extraction of iron impurities from non-ferrous swarf, minerals and residues, is manufactured by Davies Magnet Works Ltd., and is designed to withstand arduous duties with high tonnage throughput and a high range of extractions.

The Model 40 is 37 in. high, 31 in. wide and 34 in. deep, operating on standard input AC supply at 220/250 v. single phase 50 cycles. A permanent magnet drum can be fitted as an alternative to electro-magnets and drum dimension is 12 in. diameter with 14 in. face. The net weight is 950 lb. and total input 600 watts.

The unit is designed for use in handling batch or bulk separations, and an electric feeder to the magnet drum gives even distribution with feed rate control. In addition, the magnet drum is rubber faced to ensure steady movement of feed while built-in rectifier equipment dispenses with all auxiliary equipment. All rotating parts are carried in dust-proof, totally enclosed, deep grooved ball races.



The Model 40 drum separator

A Range of Mining Lamps

The acetylene, portable and stationary lamps manufactured by The Premier Lamp and Engineering Co. Ltd. are presented in a comprehensive booklet recently published by the company. It is stated that over 1,000,000 lamps produced by the manufacturers have been put to use in the various mining and industrial areas of the world. A light of 20 to 30 c.p. can be obtained from the various types of portable lamps.

Among the units described are the Premier acetylene mining or engineering lamp with positive screw lock, eccentric lever lock in two types, centre screw lock in two types, and the improved model miners' cap lamp.

Demonstration of Earthmoving Machinery

Five units of Caterpillar earthmoving machinery, reported as being imported from the United States in *The Mining Journal* of September 16, were seen in action for the first time in the U.K. at a five-day demonstration held recently near Barnsley.

The Caterpillar D9 tractor with direct drive transmission was shown in conjunction with the Caterpillar No. 90 scraper, having a capacity of 27 cu. yd., while another D9 with torque converter transmission was demonstrated as a pusher, loading the tractor-drawn scraper units as well as two of the latest series of Caterpillar DW21 units. On another nearby site the Caterpillar DW21 in conjunction with the Athey 31 ton rear dump wagon was demonstrated.

Self-loading No. 90 caterpillar scraper

None of the machines demonstrated was under 286 h.p. or the scrapers under 25 tons in capacity. One scraper, the No. 90, has a capacity of 31½tons.

The demonstration featured the two 23 ton D9 tractors, two of the new higher-powered DW21C tractor and scrapers, the new PR21 Athey rear dump truck, and the Caterpillar No. 90 scraper. Quick loading, rapid hauls and low cycle time characterised the whole operation. The two DW21's and the direct drive D9 coupled to the No. 90 scraper, were engaged on scraping, being push-loaded by the torque convertor D9. In the first hour figures showed that the three machines had moved over 1,200 tons of material. These figures were later improved.

Overburden consisted of heavy clay which served to demonstrate the boiling action of the scraper bowls. The next strata to be reached was shale and clay, and here the push-loaded scrapers were maintaining fourteen 2,800 ft. cycles to the hour. The D9 powered No. 90 scraper operated on a 2,000 ft. haul.

On a nearby site the PR21 rear dump wagon, comprising a Caterpillar DW21 tractor with 31 ton capacity wagon by Athey, was moving boulder shale. It was hauling up a 1 in 8 gradient to a dump 250 yds. away. Loaded by a Lima 3½ cu. yd. excavator, the PR21 was completing the 500 yd. cycle in less than 12 minutes. This time included four minutes for loading, five minutes for climbing the 1 in 8 gradient (1 in 6 at the steepest part), dumping and returning for loading. The PR21 found the haul a comfortable second gear climb.

Suitable for operating in confined spaces, the PR21 should prove to be a popular piece of equipment in open cast mining. Fitted with the normal scraper attachment the DW21 can be used for stripping overburden. Fitted with the Athey wagon it can handle 31 tons of material on each haul from the cut.

The PR 21 Athey rear dump wagon

METALS, MINERALS AND ALLOYS

COPPER.—Although the custom smelters have now dropped their price down to 45 c. per lb. the big producers are still finding it difficult to meet the demand at 43 c. Mr. E. S. Hann, treasurer of Kennecott Copper said last week that "there will be considerable pressure" to cut prices "if producers are able to continue capacity production." But, of course, this pressure will not make itself felt till the turn of the year when buying for inventory to avoid heavy tax assessment will come to a halt. However, it may come to a halt quite suddenly for copper deliverable on December 31 will be worth a bit more than that deliverable on January 1. In other words when the break does come it may be a sharp one and its severity may be increased by the fact that the situation is made for speculation. It is also worth recalling that a similar situation arose last year and it was later agreed that the forecasts of likely inventory buying had been very much over-estimated.

Reuter reports that the U.S. Treasury has ruled that copper bought now for delivery in the first half of 1956 will count as 1955 copper for tax purposes. If this is so it will certainly even out buying—and this may be the intention. But the report is not official.

In spite of the fact that the Americans have much more detailed statistics on commercial stocks than exist in the United Kingdom there is still a good deal of uncertainty as to how far consumers have actually run down their stocks in the course of 1955. Furthermore, the American demand situation has been obscured by the fact that since the big producers have refused to follow the market up they have been forced to ration available supplies. In such a situation there is bound to be a fair amount of "unreal" demand when consumers tend to ask for double their true requirements in the hope of getting at least what they want. It is only when the price comes under pressure that it is possible to see the depth of the froth and sometimes it is alarmingly deep. It is considerations such as these that are making copper jumpy on the L.M.E. The L.M.E. cannot be blamed for price fluctuations for the big unknown that lies behind them is the true strength of American demand in the first quarter of 1956 and that is still anybody's guess.

It does not really add to our knowledge to say, as Mr. Hann said, that his firm saw no decrease in American demand in 1956. What we want to know is the urgency with which that demand will be pressed.

The rapid recovery in output after the strike in the U.S.A. is illustrated by the September figures now available. Production of crude copper in the U.S.A. was 107,490 tons against 77,354 in August; refined copper reached 139,880 against 98,732 tons. Outside the U.S.A. September production of crude copper reached 141,165 tons of primary and 1,049 of secondary against 110,701 and 774 in August.

After the rejection of its wage claim the African Mineworker's Union has met to consider the situation but it has so far taken no decision on any action.

Hoisting of ore at Chibuluma commenced this week. Ore hoisted during the next few months will be stockpiled until completion of the concentrator. (See *M.J.* of October 7, page 410, for further details).

The company Mines de Cuivre de Mauritanie has decided to increase its capital from 300,000,000 African francs to 400,000,000 by the issue of 10,000 shares of 10,000 African francs each. The company plans to exploit the copper deposit of Akjoujt, Mauritania, French North-West Africa.

LEAD.—Demand for lead has been good in the United States on the basis of 15¼ c. per lb. New York and a combination of three factors—the readiness of G.S.A. to pay the price for stockpile metal, the seasonal strong demand from the battery makers, and the recent increase in the price of zinc—has led to renewed talk that the price will shortly go higher still.

In many ways it would be a good thing if it did. When the combined price was 28 c. there was much heart-searching as to whether the G.S.A. could be persuaded to pay more. It is now obvious that as soon as it is decided that G.S.A. can be persuaded to buy at one price, speculation arises as to whether it can be persuaded to buy at a higher. It would certainly make for general stability if G.S.A.'s intentions were fully tested by the only way open—by raising the price and watching the result. The combined price must now be bumping close to G.S.A.'s upper limit and the belief that this is so inevitably raises speculation and uncertainty.

Mr. A. Fletcher, president, St. Joseph Lead, has called for a permanent programme of assistance for the American mining industry. He called for a moderate increase in tariff coupled with a moderate stockpiling programme to take up surplus supplies. The word "moderate" was not defined. The advantages of this scheme as he saw it would be to establish American prices at a higher level than world prices, to help American industry without overstimulating foreign mines, and to allow foreign mines to continue to export to America a portion of their metal.

Meanwhile Mr. Fleming, Office of Defense Mobilisation, has said that the goals of strategic materials stockpiling should be increased. He has, apparently, refused to amplify this statement but it has put heart into the mining industry.

TIN.—Tin has kept its level of between 96 and 96¼ c. per lb. in New York for spot Straits metal. Demand has been good but without any exceptional features and the metal has continued to come under the shadow of Wall Street's uncertainty.

The Federal Facilities Corporation has mailed 110 copies of a brochure about the Texas smelter but officials say that no firm offers have been received. It is being said that the major obstacles to a sale is the lack of assurance that ores will be available, and it is suggested that the Government could buy ores as part of a foreign relations programme but that "interlocking" arrangements with other smelters might make it difficult for a private firm to get supplies.

Obviously, however, if Billiton were to buy the smelter it would have no difficulty in getting supplies and the same applies to any respectable tin interest. Of course, it is true that the tin industry has surplus smelter capacity and it would have to have some obvious advantage in using the Texas smelter. Since the smelter is not among the world's most efficient it is not easy to see what that advantage could be. Indeed, if the smelted tin were to be sold on the markets competitively it could only be because the smelter was sold at a knockdown price. This, in fact, seems to be the real difficulty in getting rid of the smelter.

So far, the smelter has been the plaything of Texan politics, but now it is entering national politics. The Democrats have long been accusing the Administration of treating public utilities less favourably than big business—with some success in the matter of electric power supplies—and they would object to a sale of the smelter at a give-away price. Such a sale might look unwise in an election year. Yet at anything above a knockdown price it may be very difficult to find a buyer. Of course if an offer were made to take the output into the stockpile that might provide a solution but the Democrats might then claim that if an inefficient smelter is required in the national interest then the government ought to run it.

U.S. tin consumption in August increased 20 per cent and the consumption of pig tin was the largest since January, 1951, totalling 7,985 l.tons. Stocks held by the government and industry, but excluding the strategic stockpile declined during August from 39,350 to 38,750 tons. Industrial stocks increased by 105 tons to 15,685 at the end of August, the highest level since April 30, 1951.

ZINC.—On October 17 the price of prime western zinc East St. Louis basis was raised ½ c. to 13½ c. by Eagle-Picher Co. and St. Joseph Lead Co. At the time of going to press the price had been followed by one or two but not by all producers and a split price therefore persists. Not unnaturally demand is exceedingly brisk at the lower figure and rather quieter at the higher one; but demand at 13½ c. is not so timid as to suggest that consumers believe that the price will be forced back again. So another problem will shortly arise when the trade will have to find out whether G.S.A. will stockpile metal at this price. As is suggested in our lead notes it may not be a bad thing to push the price of lead and zinc upward to determine the prices at which G.S.A. will refuse. This knowledge would disperse a good deal of the present uncertainty about zinc prices.

ALUMINIUM.—We have frequently remarked upon the particular attention which the aluminium producers have been showing to product development in those industries in which the potential exists for large tonnage consumption of this metal, notably in the construction industries. An interesting step in this direction was announced last week by Aluminium Ltd. who have negotiated a $3,000,000 contract with the Colombian Government for the supply of 3,200 light-weight aluminium houses especially designed for the tropics. These houses, the outcome of part of the group's research programme, are to be fabricated in the United Kingdom from aluminium supplied from the group's Canadian smelters. Some indication of the potentiality in this single application may be judged from the fact that the Colombian Government estimates that it needs

500,000 housing units for its rural areas alone, and the same can doubtless be said of many other tropical countries.

It is against this background of most energetic and varied sales development (of which the above is little more than "the example of the week") that the industry's vast production expansion projects are to be seen in their true perspective. As such they appear, if anything, inadequate rather than excessive.

Also against this background no surprise will be occasioned by the announcement over last week-end of the British Aluminium Company's plans to build a $130,000,000 primary aluminium plant at Baie Comeau on the north shore of the St. Lawrence, some 200 miles east of Quebec. Eventually by 1965 the plant is scheduled to have a capacity of 160,000 tons per year, although the first stage in the programme, calling for $40,000,000 and scheduled to be complete by 1957, is expected to yield an annual output of 40,000 tons while further expansions in production by similar amounts are scheduled respectively for 1959, 1960 and 1965. In making this announcement, Mr. Duplessis, Premier of Quebec, revealed that this plant is part of a larger plan which includes the expansion of the Bersimis River power project to its full capacity of 1,750,000 h.p.

MANGANESE.—The Vanadium Corporation of America is reported to have purchased the Baharti manganese mine near Fort Rosebery in Northern Rhodesia. Although the purchase price has not been divulged the quality of the deposits is believed to be high. A subsidiary company has been registered in Salisbury to work the deposits. It will apparently be an opencast operation, ore being transported by truck across the Congo Pedicle to the railway at Mufulira.

SELENIUM.—The discovery of a deposit of commercial grade selenium ore near Baggs, in Wyoming, was announced recently by the Shawano Development Corporation which owns 3,000 acres in the Poison Basin area of this district. Dr. O. A. Beath, of the University of Wyoming, claims to have taken samples from deposits exposed in a 100 ft. tunnel in the area which on assay showed excellent concentrations of selenium, in some cases, as high as 0.68 per cent. A drilling programme is understood to have commenced about six weeks ago to determine the extent of these deposits. It is believed that this is the first discovery of selenium in economic quantities as a primary deposit. Hitherto, the most important source of commercial selenium has been the slimes produced in the electrolytic refining of blister copper.

TITANIUM.—Metal Traders Ltd., of London, are reported to have undertaken to assist Titanium Minerals Ltd.—a New South Wales company—in the financing of its plans for the production of rutile and zircon from the latter's concession near Woodburn on the north coast of New South Wales. The Metal Traders loan is to be used to recondition a separation plant. The results of test boring have given average assays of rutile at 34.1 per cent and zircon at 35.6 per cent, the gross market value of proven reserves of black concentrates at current market prices is more than £A2,500,000.

News also comes from New South Wales that the Eastern Titanium Corporation Pty. Ltd. expects to win 100,000 tons of rutile from leases at Lake Murmorah near Gosford. This will involve 20,000,000 tons of sand from 900 acres of dunes.

According to *The Financial Times* correspondent, important new deposits of ilmenite have been found in the Jossingfjord district of south-west Norway. The new deposits are said to lie close to the Sogndal ilmenite mines operated by Titania, a subsidiary of the Titan Co., and are claimed to contain over 100,000,000 tons of ore, most of which can be worked opencast. Already Titania, the sole ilmenite producer in Norway, has an annual output of 160,000 tons of concentrates (equivalent to some 16 per cent of world production) and even before the discovery of the new deposits plans were under way for raising this output by a further 40,000 tons a year.

The London Metal Market

(From Our Metal Exchange Correspondent)

During the period under review the three months' price for copper has sunk to the lowest it has been for three months, but once again there was fairly influential buying, due partly to the situation in America where metal for early delivery is still in good demand and partly to hedge buying in connection with the recent Government tender. The former has also been part of the reason for the decrease in stocks and the increase in backwardation. Most dealers feel that the present price is in line with existing market conditions throughout the world and will, therefore, be maintained until the situation in America becomes easier, which is expected to be the case shortly. If the general price level in the U.S. is established at the 43 c. per lb. level, then the market here will automatically recede £15-£20 per ton.

Demand in this country has not been as brisk as of late, and on the Continent buyers are definitely showing resistance, but as industrial stocks are still at a relatively low level a certain amount of hand-to-mouth buying has to take place. An interesting feature is that the R.S.T. price is now above the L.M.E. settlement price, and those responsible for the former must be considering a reduction, but most dealers feel that this will not take place until the Metal Exchange quotation shows more stability than at the moment.

The backwardation in tin has again increased and stocks are lower, but demand shows some signs of slackening and it may be that provided the situation in Nigeria does not worsen the price will recede. On Thursday morning the Eastern price was equivalent to £760¾ per ton c.i.f. Europe.

The demand for lead is maintained and there is some talk of an attempt to raise the U.S. domestic price. If this takes place the London quotation is likely to firm up slightly, but it is understood that stocks of lead in Europe are adequate and, therefore, there is unlikely to be any sudden buying wave.

The zinc market has responded to the increase in the U.S. price to 13½ c. by some of the producers, but it appears that the majority of the trade is satisfied with the present level and it therefore seems unlikely that there will be any appreciable movements in the market either way.

Closing prices and turnovers are given in the following table:—

	October 13		October 20	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£353¾	£354	£351	£352
Three months	£345¾	£346	£339¾	£340¼
Settlement	£354		£352	
Week's turnover	7,125 tons		5,775 tons	
Tin				
Cash	£756	£757	£760	£761
Three months	£747½	£748	£749	£749½
Settlement	£757		£761	
Week's turnover	635 tons		805 tons	
Lead				
Current half month	£106¾	£107	£106¾	£107
Three months	£106½	£106¾	£106½	£106¾
Week's turnover	2,775 tons		2,375 tons	
Zinc				
Current half month	£90¼	£90½	£91¼	£91¾
Three months	£90¼	£90½	£91	£91¼
Week's turnover	1,820 tons		6,650 tons	

OTHER LONDON PRICES — OCTOBER 20

METALS

Aluminium, 99.5%, £171 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 6d. lb.
Chromium, 6s. 11d. lb.
Cobalt, 21s. lb.
Gold, 250s. 7d.
Iridium, £30 oz. nom.
Manganese Metal (96%-98%) £269 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, £40 oz. nom.
Palladium, £7 10s./£8 0s. oz.
Platinum U.K. and Empire Refined £29 oz. Imported £35 0s. oz.
Rhodium, £40
Ruthenium, £17 oz.
Quicksilver, £91 10s. 0d. ex-warehouse
Selenium, 72s. nom. per lb.
Silver, 80d. f.oz. spot and 79¾d. f'd
Tellurium, 16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 30% 5s. 0d. c.i.f.
20% 3s. 3d. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (semi-friable) 48% £13 per ton c.i.f.
,, Refractory 45% .. £13 per ton c.i.f.
,, Smalls 42% .. £10 2s. 6d. per ton c.i.f.
Magnesite, ground calcined .. £26-£27 d/d
Magnesite, Raw .. .. £10-£11 d/d
Molybdenite (85% basis) .. 105s. 0d.-108s. 0d. per unit c.i.f.
Wolfram and Scheelite (65%) .. 270s./274s. c.i.f.
Tungsten Metal Powder (98% Min. W.) .. 21s. 5d. nom. per lb. (home)
Ferro-tungsten (80%-85%) .. 18s. 5d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £39 3s. 9d. d/d per ton
Ferro-manganese, home .. £54 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%) basis 100s. freight. .. .. .. 84d. per unit c.i.f.
Manganese Ore (38%-40%) .. 69d. per unit
Brass Wire .. .. 3s. 3¾d. per lb basis
Brass Tubes, solid drawn .. 2s. 8¾d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The past week was rather a dull one on the Stock Exchange, although prices staged a tentative recovery following Mr. Butler's more optimistic review of the situation. The overall revenue position shows a considerable deterioration on last year, mainly due to increased capital outlay. Dealings for the new account began on Wednesday, and on Thursday the market had to absorb the news of next weeks interim budget. Reactions were surprisingly good. Gilts and Kaffirs recorded small gains while many of the leading industrial issues were up by 2s. (These movements, of course, came too late to be reflected in our share list below.)

Among individual Rand mines, there was little of interest to report. Dominion Reefs went better, following the publication of the quarterly report, but later fell back to their starting point. Favourable press comment concerning the outlook for West Driefontein steadied this stock and on Thursday it went ahead by 1s. 6d. on the good quarterly result. Other price changes were erratic, but mainly downwards.

In the O.F.S., the eagerly awaited quarterly reports from the Anglo American Corporation failed to stimulate the market. Prior to the Budget announcement, there was nothing spectacular to cause an upward movement and although the higher ore reserves of the mines were technically satisfactory, this fact was ignored. Free State Geduld initially moved better on hopes of outstanding underground developments; later the shares followed the general trend. The poor results from Freddies Consolidated and the apparently depressing outlook for this mine caused a sharp setback in the price. Loraine were a little harder, due to better results from the "B" reef. It remains to be seen whether values from this reef will be consistent. The quarterly profit figures and ore reserves for St. Helena were higher, but lower payability and values dragged the shares down.

In the West African market, the end of the strike at Ashanti had no effect upon the shares which remained unchanged. Konongo and Lyndhurst, however, improved slightly following the better quarterly results.

In the miscellaneous gold section, there was some interest in Cam and Motor and Goldfields Rhodesian Development, the latter on its potentialities as an investment trust. Indian mines hardened slightly, due to a resolution passed by the Mysore Government calling for the nationalization of the properties. It was suggested that "reasonable" compensation should be paid. St. John del Rey improved on hopes of betterment in Brazil's financial affairs.

Coppers were favourably affected by expectations regarding the forthcoming Rhokana dividend and the entry of Chibuluma into production and most of the leaders went ahead. There were, however, some notable exceptions to this trend. Some speculative demand developed for Rhodesia Katanga and Tanganyika Concessions were a steady feature after digestion of the recent excellent report.

Among Eastern tin shares, the higher metal price both in Singapore and London had its effect and prices where changed, were generally higher. Kamunting rose due to the increasing output figures and favourable press comment concerning the immediate future for this property. Southern Kinta fell back after the chairman's comments on the lower output to be expected during the coming year. One dredge is being moved and lower values are to be expected from other areas.

Among Nigerian and miscellaneous tin, there was little of interest to report. The good figures from Beralt, coupled with the reform of Portuguese tax, caused a sharp rise in the shares.

In the lead/zinc market, the harder metal price produced a generally favourable reaction and the excellent figures from New Broken Hill caused these shares to leap ahead. Production figures from Uruwira made a favourable impression on the market and there was demand for the shares from the Cape.

In the miscellaneous base metals section, Central Provinces Manganese and Consolidated Murchison went ahead on steady demand and the higher dividend and greatly increased profits from Wankie caused these shares to jump.

Finance	Price Oct. 19	+ or — on week
African & European	3/-	—
Anglo American Corpn.	8½	—¼
Anglo-French	21/6	+3d
Anglo Transvaal Consol.	25/7½	.....
Central Mining (£1 shrs.)	43/3	—6d
Consolidated Goldfields	57/-	—1/9
Consol. Mines Selection	38/1½	—1/3
East Rand Consols	2/-	.....
General Mining	4⅜	.....
H.E. Prop.	7/9	—1½d
Johnnies	40/-	—1/6
Rand Mines	3⅛	—⅛
Rand Selection	42/6	—1/10½
Union Corporation	47/-	—1/-
Vereeniging Estates	4⅜	—
Writs	38/1½	.....
West Wits	37/-	—3d
Rand Gold		
Blyvoors	26/6	.....
Brakpan	6/3	.....
Buffelsfontein	35/-	—1/6
City Deep	10/6	+6d
Consol. Main Reef	21/10½	.....
Crown	2½	+⅛
Daggas	2½	—
Dominion Reefs	25/7½	.....
Doornfontein	24/-	+6d
Durban Deep	31/3	—1/3
E. Champs	5/-	.....
E. Daggas	10/-	.....
E. Geduld (4s. units)	31/-	—1/-
E. Rand Props.	2⅛	—
Geduld	4¼	.....
Govt. Areas	6/3	.....
Grootvlei	22/9	.....
Hartebeestfontein	25/-	—6d
Libanon	8/-	.....
Luipaards Vlei	18/-	.....
Marievale	21/3	—3d
New Kleinfontein	6/3	.....
New Pioneer	12/3	—3d
Randfontein	49/9	—6d
Robinson Deep	15/1½	—1/1½
Rose Deep	10/-	.....
Simmer & Jack	4/-	.....
S.A. Lands	21/10½	—7½d
Springs	3/9	+1½d
Stilfontein	26/6	—3d
Sub Nigel	35/-	+1/3
Vaal Reefs	30/3	.....
Van Dyk	3/9	.....
Venterspost	14/-	—3d
Vlakfontein	17/6	—3d
Vogelstruisbult	29/-	—6d
West Driefontein	5½	—

Rand Gold contd.	Price Oct. 19	+ or — on week
W. Rand Consolidated	40/-	—1/3
Western Reefs	36/3	—7½d
O.F.S. Gold		
Freddies	7/-	+9d
Freddies Consolidated	4/7½	—10½d
F.S. Geduld	3⅛	—
Geoffries	14/9	—3d
Harmony	30/3	.....
Loraine	7/6	+4½d
Lydenburg Estates	15/7½	—7½d
Merriespruit	8/9	+3d
Middle Wits	13/-	—3d
Ofsits	61/6	—1/-
President Brand	66/3	—1/3
President Steyn	32/9	.....
St. Helena	27/6	—1/-
Virginia Ord.	11/6	.....
Welkom	17/6	—6d
Western Holdings	3⅛	—
West African Gold		
Amalgamated Banket	2/1½	+1½d
Ariston	5/10½	—1½d
Ashanti	21/9	—6d
Bibiani	4/3	.....
Bremang	1/3	—1½d
G.C. Main Reef	2/7½	.....
Konongo	3/1½	+3d
Lyndhurst Deep	1/6	+1½d
Marlu	9d	+1½d
Taquah	2/-	.....
Western Selection	9/6	—1½d
Australian Gold		
Gold Mines of Kalgoorlie	12/4½xd	—1½d
Great Boulder Prop	10/6xd	—3d
Lake View & Star	18/9	+1/-
Mount Morgan	21/6	.....
North Kalgurli	7/1½	+3d
Sons of Gwalia	3/6	—6d
Western Mining	8/10½xd	.....
Miscellaneous Gold		
Cam & Motor	9/-	+1½d
Champion Reef	4/6xd	+3d
Falcon Mines	7/-	.....
Globe & Phoenix	25/-	.....
G.F. Rhodesian	6/3	+3d
Motapa	1/1½	—1½d
Mysore	3/3	.....
Nundydroog	7/6xd	+3d
Ooregum	4/3	.....
St. John d'El Rey	16/3	+1/-
Zams	53/6	—3d

Diamonds and Platinum	Price Oct. 19	+ or — on week
Anglo American Inv.	8⅛	—⅛
Casts	28/9	—6d
Cons. Diam. of S.W.A.	7½	.....
De Beers Defd. Bearer	6⅜	—⅛
De Beers Pfd. Bearer	15½	.....
Pots Platinum	9/3	.....
Waterval	16/6	—3d
Copper		
Bancroft	39/-	+3d
Chartered	67/-	—1/6
Esperanza	3/9	+1½d
Messina	8⅛	—⅛
Nchanga	13⅛	+⅛
Rhod. Anglo-American	5¼	—⅛
Rhod. Katanga	27/-	+1/-
Rhodesian Selection	45/-	+6d
Rhokana	39½	+1½
Rio Tinto	3⅜	+⅛
Roan Antelope	25/9	+3d
Selection Trust	3½	+⅛d
Tanks	7⅜	.....
Tharsis Sulphur Br.	5¼	.....
Tin (Eastern)		
Ayer Hitam	23/1½	+10½d
Gopeng	8/9	.....
Hongkong	7/10½	+4½d
Ipoh	21/3	.....
Kamunting	10/3	+6d
Kepong Dredging	3/7½	+3d
Kinta Tin Mines	15/9	+6d
Malayan Dredging	9/6	+3d
Pahang	12/9	.....
Pengkalen	10/7½xd	—1½d
Petaling	10/-	.....
Rambutan	20/-	.....
Siamese Tin	7/10½	.....
Southern Kinta	17/3xd	—1/3
S. Malayan	8/1½	+3d
S. Tronoh	8/-	+3d
Sungei Kinta	15/9	.....
Tekka Taiping	6/9	.....
Tronoh	8/9	+10½d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	12/7½	.....
Beralt Tin	32/3xd	+9d
Bisichi	5/4½	—1½d
British Tin Inv.	23/-	+1/-
Ex-Lands Nigeria	2/4½	.....
Geevor Tin	14/6	+3d

Tin (Nigerian and Miscellaneous) contd.	Price Oct. 19	+ or — on week
Gold & Base Metal	2/-	.....
Jantar Nigeria	7/-	+3d
Jos Tin Area	14/6	—3d
Kaduna Prospectors	2/-	.....
Kaduna Syndicate	3/-	.....
London Tin	9/1½	+4½d
United Tin	1/10½	.....
Silver, Lead, Zinc		
Broken Hill South	56/3xd	—1/10½
Burma Mines	2/9	+4½d
Consol. Zinc	50/9	+3d
Lake George	11/4½	+4½d
Mount Isa	60/6	+6d
New Broken Hill	40/7½	+2/7½
North Broken Hill	77/-xd	—1/6
Rhodesian Broken Hill	13/9	+1½d
San Francisco Mines	24/-	.....
Uruwira	6/6	+7½d
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A	49/6	—1/6
Associated Manganese	37/-	.....
Cape Asbestos	9/10½	+6d
C.P. Manganese	33/9	+2/1½
Consol. Murchison	57/6	+7½d
Natal Navigation	3	.....
Turner & Newall	97/6	+1/6
Wankie	18/-	+1/3
Witbank Colliery	4¼	.....
Canadian Mines		
Dome	$29	.....
Hollinger	$36	.....
Hudson Bay Mining	$112	+3
International Nickel	$132	+5½
Mining Corpn. of Canada	£8	—
Noranda	$92	+1
Quemont	£8½	.....
Yukon	4/1½	.....
Oil		
British Petroleum	5⅜	+⅛
Apex	30/9	—3d
Attock	41/-	+6d
Burmah	3⅜	+⅛
Canadian Eagle	47/-	+2/-
Mexican Eagle	22/3	.....
Shell	6½	+⅛
Trinidad Leasehold	37/3	+3d
T.P.D.	25/-xd	—1/6
Ultramar	27/9	.....

COMPANY NEWS AND VIEWS

More Rand and O.F.S. Quarterlies

Returns in respect of the three months ended September 30, 1955, have now been received from the Consolidated Goldfields, Johannesburg Consolidated, Anglo-Transvaal and General Mining Groups (in addition to the Anglo American and Union Corporation results referred to here last week).

Although the information contained in these reports will be dealt with as usual in our Quarterly Analysis Supplement, due to be published next week, one or two features stand out as being of particular immediate interest. Amongst these the excellent report from West Driefontein comes high on the list. At this mine an outstanding improvement in development values to 979 in. dwt. from 861 in. dwt. was obtained.

In the General Mining group initial development at the new Buffelsfontein Mine was most satisfactory. A small amount of crosscutting and developing on reef from the Pioneer ventilation shaft at this property gave 100 per cent payability from 50 ft. sampled with average values of 11.55 dwt. of gold over a width of 42.7 in. equal to 493 in. dwt. This represents a much better gold content than that of 314 in. dwt. obtained when the Vaal Reef was first cut. Both payability and development values improved at Stilfontein—the former to 84 per cent from 74 per cent and the latter to 378 in. dwt. from 265 in. dwt. Included in this mine's development work during the past quarter was 50 ft. sampled on the Contact reef which gave 100 per cent payability averaging 24.9 dwt. over 21.5 in., equal to 535 in. dwt. A similar footage in the previous quarter yielded 232 in. dwt.

The September quarterly from Freddies Consolidated gave little encouragement. There was a drop in payability to 54 per cent from 73 per cent but on the other hand in. dwt. rose to 358 from 305 in. dwt. during the previous quarter. No favourable news regarding exploration of new areas on the property was forthcoming.

From Hartebeestfontein in the Anglo-Transvaal group was reported a decline in values to 400 in. dwt. from 458 in. dwt. Payability, however, remained virtually unchanged at about 95 per cent. It was also disclosed that construction work to increase plant capacity to 75,000 tons is in progress. Merriespruit also suffered a decline in values to 294 in. dwt. from 363 in. dwt. Payability fell away to 56 per cent from 62 per cent. Virginia's payability remained about the same at 47 per cent but values fell to 305 in. dwt. from 346.

Rooderand's Drop in Investment Values

The book value of Rooderand Main Reef Mines' holding in Freddies Consolidated Mines as at June 30 this year, amounted to 55.6 per cent of the value of its quoted portfolio. In view of the decline which Freddies Consolidated shares have suffered during past months it is not, therefore, surprising that the market value of Rooderand's quoted investments should have fallen to £1,201,252 from the previous year's figure of £1,557,933. Total book value of investments, however, showed an increase at £2,013,319 from £1,764,243.

Besides its holding in Freddies Consolidated, the company has a fairly well spread gold portfolio. This includes Anglo-Transvaal Consolidated Investment Company, Eastern Transvaal Consolidated Mines, General Exploration O.F.S., Hartebeestfontein Gold Mining Company and Middle Witwatersrand (Western Areas). A breakdown of quoted investments, based on market prices as at June 30, shows that 75.8 per cent were in mining and exploratory companies. Shareholdings in financial companies amounted to 19.4 per cent while industrials accounted for 4.8 per cent.

Mr. S. G. Menell is chairman. Meeting Johannesburg, October 31.

Anglo's Development Corporation to Purchase £5,000,000 Rolling Stock for Hire to Rhodesian Railways

An agreement has been reached between the Anglo American Rhodesian Development Corporation and the Federal Government of Rhodesia whereby the Corporation will finance the purchase of rolling stock—mainly already on order for delivery by 1956—to the value of some £5,000,000 which it will then hire to the Rhodesian Railways for 25 years or longer. An agreed scale of payment has been worked out but details have not yet been published.

Payment for the rolling stock—mainly of the high sided bogie type—will require £750,000 in 1955 and £3,500,000 in 1956, but the Corporation is prepared to make available immediately £750,000 for the purchase of tank cars and other miscellaneous stock required.

One of the stated objects of the Rhodesian Development Corporation—formed in June last by Sir Ernest Oppenheimer—was to give assistance where required for private undertakings and public works of value to the Federation. As the Federal Government will, over the next few years, be faced with enormous expenditures, the new agreement, in helping to ease the financial strain, fits neatly into this plan. It is interesting, however, that the present arrangement should differ substantially from another reached between the same two parties late last year. It will be remembered that this operation took the form of a straight loan of £1,000,000 to enable Rhodesia Railways to purchase 500 high sided trucks. Under the new agreement, however, the rolling stock will become the actual property of the Development Corporation, although the ordering of them and the control of their use after delivery will be entirely in the hands of the Railways. In hiring the trucks to the Railways, the Corporation is undertaking a long term contract which may well yield a low return, but this is, of course, a minor consideration when put beside the contribution it can make to the solution of the Copperbelt's transport problems, which have for so long retarded expansion plans, as well as to the handling of Wankie's rapidly expanding coal production.

Wankie Pays More

A dividend of 6d. per 10s. share on its issued ordinary capital of £4,412,500 has brought Wankie Colliery Company's total payment in respect of the year ended August 31, 1955, up to 10½d. or 8¼ per cent. Distribution in respect of the previous year amounted to 9d. per 10s. share or 7½ per cent.

Reflecting substantially increased sales outputs of coal and coke, profits for the past financial year were at £824,012 nearly double those earned in the preceding 12 months (£424,202). These figures were struck after all charges including taxation and debenture interest. A total of £250,000 (£105,000) was placed to general reserve and £165,000 (nil) to taxation equalization reserve.

Sales outputs of coal and coke during the past year amounted to 3,268,077 tons and 198,674 tons respectively. This compares with 2,732,957 tons and 154,617 tons for the previous year. This considerable improvement has been maintained during the first month of the current financial year during which a total of 295,927 tons of coal and 18,341 tons of coke were sold as compared with 245,464 tons and 15,317 tons respectively during the previous corresponding period. It will be recalled that the production target aimed at by the new technical managers, the Anglo American Corporation, envisages an output of more than 5,000,000 tons of coal annually by the end of next year.

It is against these enormous expansion plans that the decision to reduce coal prices charged to Northern Rhodesian copper mines as from November 1 by 6d. per ton must be viewed. This, together with the reduction of 3d. per ton for unwashed coal and other low grade coal used by power stations by 1s., would under normal conditions mean lower profits. But as railway capacity improves (and this will bring still further price reductions) the corresponding advance in Wankie's sales will more than compensate for lower profit margins. What these might be under the new conditions is not yet known, but the previous figure was 5s. 3d. per ton.

Meanwhile, at their present price of about 18s. Wankie 10s. ordinary shares return 4¼ per cent.

Mr. T. Coulter is chairman.

Uruwira's Plant in Operation

A first quarterly report from Uruwira Minerals, the Tanganyika lead property, has disclosed that the company's new plant at Mpanda has come into operation. The report, which is in respect of three months ended September 30, 1955, states that a total of 66,404 tons of ore were treated during the period. Assay values were as follows: lead, 2.79 per cent; copper, 0.49 per cent; silver, 70.8 grams per ton; and gold, 1.5 grams per ton. Production of concentrates amounted to 3,278.28 tons assaying 50.34 per cent lead; 8.58 per cent copper; 1,229.8 grams silver; and 25.1 grams of gold.

As the coming meeting of Uruwira Minerals is scheduled to take place in Kenya on October 24, much interest will attach to any comments that H.H. Prince A. E. de Linge, the chairman, may make on the progress of operations by that time. Meanwhile, it appears that production is proceeding satisfactorily and that the initial target of 30,000 tons throughput per month may soon be reached. There has, of course, been a good deal of delay in reaching this objective, the date for which was originally set at July, 1955.

London Tin Expects to Maintain 28 Per Cent

Speaking at the meeting of London Tin Corporation, the chairman, Mr. J. Ivan Spens, stated that an estimate had been made of anticipated revenue from tin mining companies and other investments as at September 30 which indicated (in the absence of unforeseen circumstances) that it would be possible to maintain a dividend of 28 per cent for the year ending April 30 next (for full speech see page 478).

In response to a shareholder's question, Mr. Spens clarified a point concerning the spread of his company's holdings which has recently been the subject of considerable interest. The corporation's interests, he said, both quoted and unquoted outside the sphere of tin mining, amounted to 15 per cent of the total book value of investments.

Kolar Nationalization Plans

Following Mr. M. A. Sreenivasan's recent statement to shareholders of the Kolar Gold Field Mining Companies in which he said that a team of officers from the Central Indian Government and Mysore State were to examine technical and financial implications of nationalization, the news has since reached London that a resolution, passed unanimously by the State Legislative Assembly, requests that steps to nationalize the British-owned gold mines proceed immediately.

Regarding compensation, the Mysore State Home Minister said that the government had no desire to expropriate any property without paying "reasonable compensation".

Company Shorts

Union Corporation Declares Increased Dividend.—Union Corporation have declared an interim dividend in respect of the current year to December 31 next, of 1s. per share less U.K. income tax, compared with an interim 10.909d. per share last year. It is emphasized by the company that this increased interim payment should not be interpreted as an indication that the board have decided to increase the total distribution for the year.

General Mining Maintains Interim.—With the declaration of a dividend amounting to 10 per cent on its issued ordinary capital of £2,882,820 in shares of £1, General Mining and Finance Corporation has maintained an interim distribution at the same level as that of the previous year.

Further Reduction of Witwatersrand Gold's Issued Capital.—As present cash resources of Witwatersrand Gold Mining Co. are in excess of requirements, it is proposed that a further return of capital should be made at the rate of 5s. per share. This would absorb a sum of £117,406 5s. thereby reducing the capital to £199,590 12s. 6d. divided into 469,625 shares of 8s. 6d. each. It will be recalled that the company's capital had previously been reduced—in four stages—to £316,996 17s. 6d. divided into 469,625 shares of 13s. 6d. each.

Van Ryn Gold to Return 1s. Per Share.—It has been announced by Van Ryn Gold Mines Estate that 1s. per share will be returned to equity holders. Last April a similar repayment reduced the nominal value of issued shares to 3s.

Capital Reduction by New State.—In terms of a special resolution passed on October 28, the capital of New State Areas was reduced from £1,514,037 to £1,362,633 6s. by returning 2s. per share in cash to shareholders in respect of the 1,514,037 issued shares.

Consolidated Zinc Pays 1s. 6d. Interim.—An interim dividend of 1s. 6d. (U.K. currency) has been declared by The Consolidated Zinc Corporation on its £8,730,596 ordinary capital in respect of the year ending December 31, 1955. This compares with 1s. 3d. a share previously on the £6,547,947 ordinary capital (before a rights issue at the end of last year) which was followed by a 2s. 6d. final.

G.M.K. (Aust.) Announce Final Call of 6s. 6d.—Gold Mines of Kalgoorlie (Aust.) have recently announced that the second and final call of 6s. 6d. (Australian) in respect of 1,869,510 newly issued shares will be due and payable on October 28. The final date for payment, however, is November 11.

Mining Matters

The Anglo American Corporation of South Africa Ltd. has offered a donation of £100,000 for the foundation of a Research Institute of African Geology under the direction of Professor W. Q. Kennedy, F.R.S., to the University of Leeds. The Research Institute will be an integral part of the Department of Geology of which Professor Kennedy is head, and will have as its primary objects: fundamental research into the origin of mineral deposits generally and the study of African geological structure in particular, and the training of post-graduate research geologists by active field work in connection with problems of African geology. The personnel of the Institute will include research fellows and post-graduate research students who will work on complex problems of rock construction, tectonics, and mineral distribution in various parts of Africa.

Mond Nickel Fellowships, 1955: Among the Mond Nickel Fellowships awarded for 1955 are that to **D. H. Butler,** The Phosphor Bronze Co. Ltd., to study the production of copper and its alloys, with particular attention to foundry methods, in the United Kingdom, on the continent of Europe and in America, and that to **R. W. N. Dron,** Rhoanglo Mine Services Ltd., to study the organization of research an its relation to production in extraction metallurgy in the United Kingdom and North America.

The Dominion Rubber Co. Ltd. announce the change of name of the company to **U.S. Rubber International (Great Britain) Ltd.,** effective September 26, 1955. This change in no way affects the structure of operation of the company, whose registered offices remain as heretofore at 62 and 64 Horseferry Road, London, S.W.1.

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Applications are invited for a Stanley Elmore Research Fellowship in Extraction Metallurgy. The stipend of the Fellow will be determined by the Selection Committee according to the Fellow's experience and qualifications. It will not be less than £800 or more than £1,000 p.a.

The period of the Fellowship will be for 2 or 3 years and will be determined in consultation with representatives of the Institution of Mining and Metallurgy.

The research work will be carried out in the Department of Metallurgy of a University or similar Institution in the United Kingdom, to be chosen in consultation with the successful candidate.

Applications, indicating the subject and range of the proposed research, together with full details of training, experience and the names of two referees should reach the Stanley Elmore Trust, 175 Temple Chambers, Temple Avenue, London, E.C.4., by December 31, 1955.

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LONDON TIN CORPORATION

CHAIRMAN'S SPEECH

The Twenty-ninth Annual General Meeting of London Tin Corporation Limited was held on October 14 at The Chartered Insurance Institute, 20 Aldermanbury, London, E.C.

Mr. J. Ivan Spens, O.B.E., chairman of the Corporation, who presided, said :—

ACCOUNTS

It is hoped that the accounts in the form now presented will make clear to shareholders that the Corporation's subsidiary companies, whether wholly or partly owned, are, in the main, registered and administered abroad.

The observations which I have to make relevant to the accounts are therefore confined to the Corporation's profit and loss account and to its balance-sheet.

The profit for the year, before taxation, was £1,402,833 compared with £1,202,664 for the previous year.

Taxation took £715,000 against £718,000 last year, the decrease being due to the cessation of excess profits levy and to the adjustments from previous years.

The net profit after taxation is thus £687,833 against £484,664 last year.

General reserve received £75,000, making it up to £800,000, and the dividend of 28 per cent, less tax at 8s. 6d. in £, paid on June 16, 1955 (compared with 24 per cent, less tax at 9s. in the £ last year), took £582,536, leaving £30,297 to be added to the amount carried forward, which now stands at £339,514.

Following the procedure in recent years the dividend was paid as an interim and was announced in May, 1955, with a statement that no final dividend would be recommended, and shareholders were informed accordingly.

Shareholders will probably be especially interested in the balance-sheet changes which show that investments increased by £451,509 whilst debtors and cash were lower by £370,826 at a total of £821,041. Against this latter figure current liabilities stood at £748,277, including £582,536 required for the dividend which was paid six weeks after the close of the year.

It will be observed that funds surplus to normal requirements had been invested at the close of the year, but it must be appreciated that it is often not possible or desirable to achieve such a position. An estimate has been made of the anticipated revenue from tin mining companies and other investments held by your Corporation as at September 30, 1955, and this indicates that it will be possible for the board to maintain the dividend of 28 per cent for the year ending April 30, 1956, unless any unforseen circumstances arise.

PRICE OF TIN

The average London price of tin metal during the year was £723 per ton compared with £660 per ton in the previous year. This improvement is reflected to some extent in the profits of tin mining companies and in the income of this Corporation but the upward trend in mining costs continues whilst taxation and royalties abroad show no remission

The requisite number of tin consuming countries have ratified the International Tin Agreement but, on the producers' side, ratification by the Indonesian Government was deferred because of more urgent business, and is now further delayed because of the general elections in that country. Siam's ratification is also awaited. It is hoped, however, that the Agreement will be functioning by the spring of next year.

The United States Government has agreed to keep the Texas smelter in operation for 12 months from July 1, 1955, and the surplus of world production is being absorbed since the refined tin from the smelter is not being marketed. In the meantime, however, the smelter is being offered for sale.

As mentioned last year, the industry must provide a substantial amount of tin, or the equivalent in cash, for the buffer stock which is to be established under the Agreement, and companies will, therefore, have a portion of their liquid resources so occupied.

MALAYA

In Malaya, precautions have still to be taken for the security of staff and mines, defences have to be maintained and there must be no complacency even although the situation continues to improve. You will have seen in the Press that the authorities have declared an amnesty to the terrorists, but it is not possible to predict the result at this stage. Constitutional changes in the Federation have recently become effective whereby the nominated Federal Legislative Council has been replaced by a partially elected Council which is presided over by a Cabinet of Ministers. Mining interests are represented and we look forward to continued stability of Government which will allow the resources of Malaya to be developed in the best interests of the country.

It was possible to undertake some prospecting during the year but certain areas are still difficult on account of security and for other reasons It remains of first importance to find and prove fresh ore reserves to take the place of those now being mined and this need is receiving constant attention.

The output of tin concentrates during the year from the mines under the management of Anglo-Oriental (Malaya) Ltd. was 17,595 tons as compared with 15,916 tons during the previous year. Three dredges started operating after having been transferred to new areas and two were closed down, having exhausted their ore reserves.

The dredges under the management of Anglo-Oriental (Malaya) Ltd. in Malaya number 40. At the end of the year under review nine were idle, of which four are without reserves. Of the remainder two are being transferred to new areas, one cannot at present be operated because of security conditions, one is to be equipped with special plant for treating tin-bearing clay, and one in an area which has been dangerous is to be rehabilitated when the necessary materials on order arrive.

It is noteworthy that the cost of dismantling, transporting, and re-erecting dredges on new areas, including reconditioning and improvements, new camp sites, ancillary buildings and equipment, has varied between £150,000 and £450,000 per dredge. These figures which take no account of the cost of the new area, afford shareholders some idea of the the money the tin mining companies must put away out of taxed profits in order to ensure the continuity of their business, without, I would stress, any material increase in their treatment capacity, for the reconstruction of a dredge often does not permit any material increase in its treatment capacity, nor even in its output if the recoverable values in the ground remain the same. As I told you last year, the new deposits which are being found and which must be worked to maintain production are tending to be lower in grade per cubic yard and deeper than previously. An adequate tin price is, therefore, more than ever essential.

SIAM

In Siam conditions remained generally favourable for mining operations. The output of tin concentrates during the year was 626 tons compared with 368 tons in the previous year. Two dredges were operating at the close of the year under the management of Anglo-Oriental (Malaya) Ltd. One of these had been successfully brought into production during the year. Two more dredges were in course of re-erection on a new property at the end of the year and one of these has since started production.

BURMA

Conditions of unrest in Lower Burma still precluded active mining by Tavoy Tin Dredging Corporation Ltd., but a survey of one of the dredges has been carried out.

There is nothing fresh to report in connection with the proposal to enter into a joint venture with the Government of Burma but the proposal is still being considered.

NIGERIA

The production of tin concentrate from the mines under the management of A. O. Nigeria Ltd., was 4,441 tons, compared with 4,480½ tons in the previous year. Columbite production was 1,102½ tons as compared with 940 tons in the previous year.

As chairman of Amalgamated Tin Mines of Nigeria Limited, in which company this Corporation holds a substantial share interest, I shall shortly be addressing the shareholders of that company at its annual general meeting, and a copy of my speech and the accounts of that company will be sent to the shareholders of this Corporation for their information.

NYASALAND

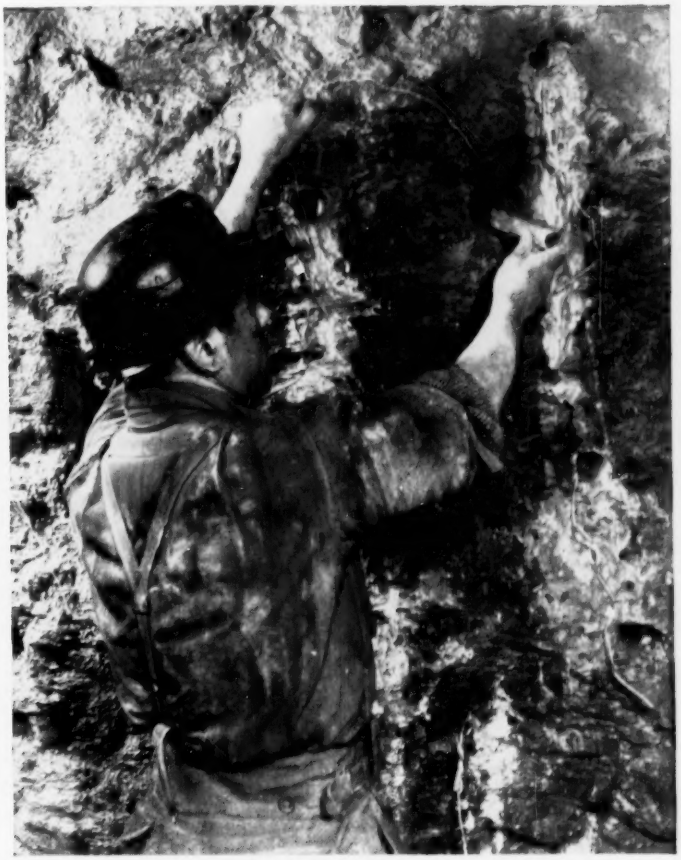
Prospecting continued during the year under review under the direction of London Nyasaland Mining Corporation Ltd., but has since been suspended in view of the doubtful results obtained and the uncertainty in connection with being able to market the niobium-bearing pyrochlore.

STAFF

Our thanks are again due to the managements and staff throughout the Organization for the work carried out during the year.

Mr. D. T. Waring, Chairman of Anglo-Oriental (Malaya) Ltd., and a Director of this Corporation, is with us to-day; Mr. H. E. Wilson, Chairman of A. O. Nigeria Ltd., is also over here, which has enabled us to have discussion on current matters.

The report and accounts for the year ended April 30, 1955, were adopted and the retiring directors re-elected.



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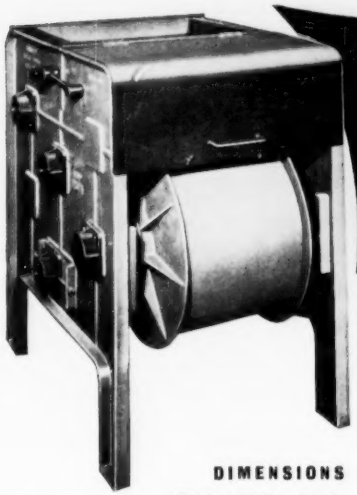

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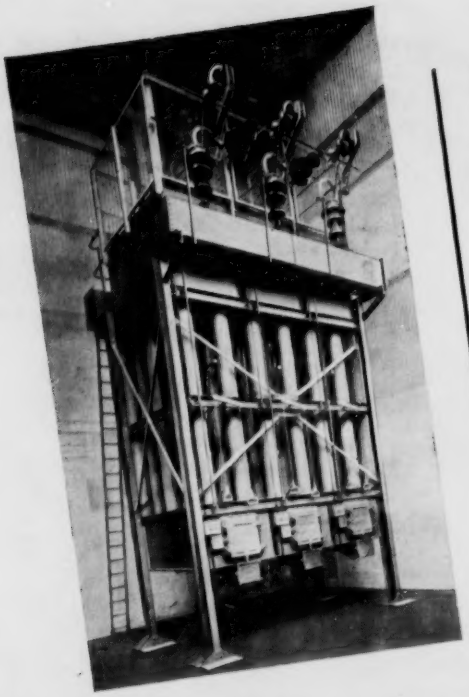

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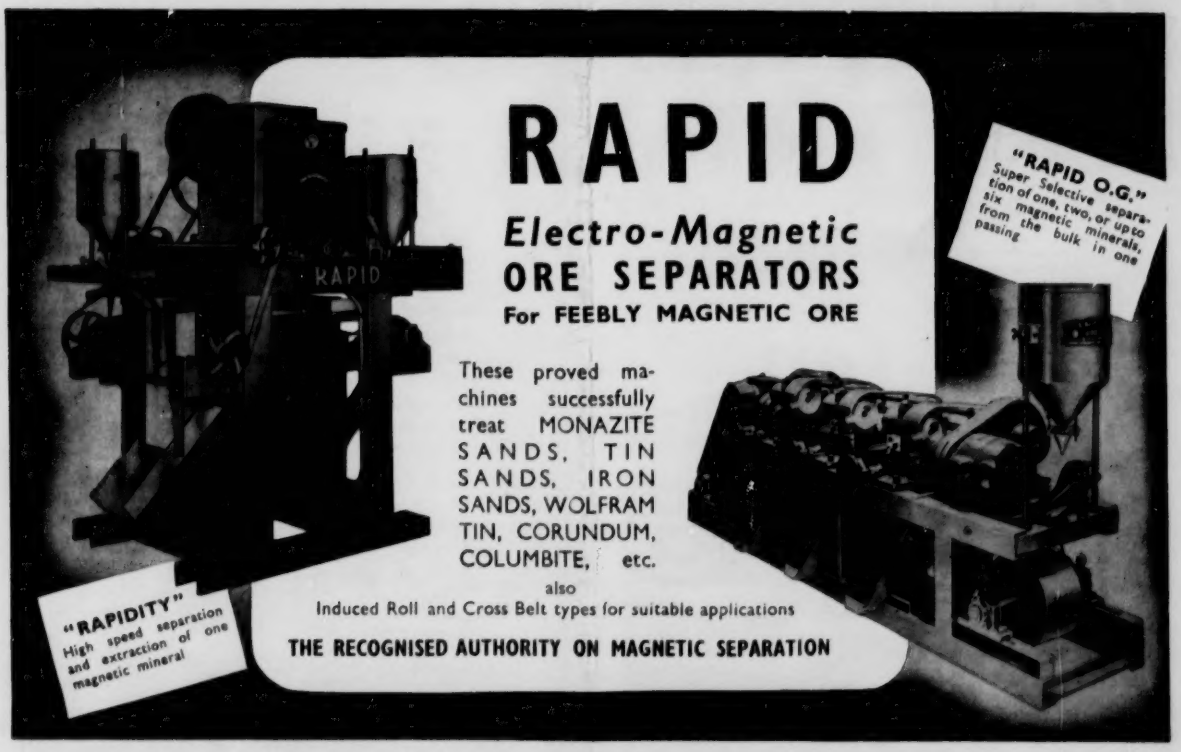

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